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FORMERLY

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VOL. CXI., No. 15
WHOLE No. 3214

NEW YORK, SATURDAY, OCTOBER 11, 1919

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Public Utility Field Most Attacked and Least Defended of Any Special Line of Endeavor

Publicity Properly Applied Will Act as Panacea for Every Trouble That May Confront a Gas Company—Publicity and the Labor Problem

By W. A. FAIRSERVICE

Manager, Department Public Information, Kings County Lighting Company, Brooklyn, N. Y.

Everybody, it seems safe to say, has either had personal experience with or has heard of the old-time corner medicine faker, who sold a bottle of fluid which he guaranteed would cure all ills. In respect of publicity, I'm in the same category as this old-timer, for I'm a firm believer that "pitiless publicity" properly applied will act as a panacea for every trouble that may confront a public utility.

This may seem like a pretty big undertaking, but so often has it worked out that this statement is not so rash as it seems. As a matter of fact, publicity has now advanced until it has become a science and might well be dignified as a profession, for it takes many years of hard training before a man is really equipped to fill a position adequately as publicity manager of a concern. So far has it advanced, indeed, that the exact result from any given action can accurately be forecasted.

Spirit of Fair Play Not Dead With American Public.

The public utility field has been the most attacked and least defended of any special line of endeavor. Little does the general public know or appreciate the tremendous problems that every utility company is confronted with. Now, if publicity is brought to bear on these troubles, and, if it has the one necessary basis of absolute truth, then the support of the consumers is bound to be enlisted and there can be but one result: Justice for the utility. The spirit of fair play is not dead in the hearts of Americans and this spirit can well be depended on.

Whether we are willing to admit it, publicity is the most vital factor in the world to-day. It has been used in every conceivable way by every conceivable body and always with the same result. Publicity did as much toward winning the World War for the Allies as did the combined armies of all the nations. It was this force that brought Germany to our feet and made the German people realize that they were in the wrong.

Your Problems Vitally Affect Their Well-Being.

Apply this same force to public utilities. Here is an industry, much maligned, greatly abused and subject to constant attacks by irresponsible pettifoggers seeking only to gain their own ends and caring little, if at all, for the well-being of the general public. And yet, speaking as a comparatively newcomer to the field, I can safely assert that the public utility field is composed of the most broad minded public spirited citizens in the country. Using publicity is not taking an unfair advantage, but is using a weapon that will in time wear away the opposition and will bring real understanding in its place. But publicity must be used constructively if it is to be effective.

Take as an example of constructive publicity the processes that are necessary for the manufacture of gas. It is a safe wager that not 5 per cent of your consumers have any conception of the amount of detail necessary to produce gas. Properly prepared as a news story or perhaps as a feature story for Sunday newspapers, the description of the manufacture of gas should attract a high percentage of the readers who in turn would carry along your story by word of mouth.

All Unreasonable People Not Confined to Our Territories.

Perhaps the natural question has arisen in your mind: Why should the public be interested in my problems? Because these problems vitally affect their well-being, their health and even their very lives. Here is an audience willing to listen, in a receptive attitude and yet practically neglected.

Have you had a large percentage of high bill complaints? All right, don't wait until the irate consumer has come to your office with blood in his eye and prepared to do battle. Rather go after him in his newspapers, explain the factors that go to make up a bill, get him thinking about the use of gas in his home and 10 to 1 you have shut off a complaint and have created a satisfied customer. Most people fail to realize just how economical is gas until it has been shown to them by applying its use to only one item. Could they protest legitimately when they find out that it has cost them one or two cents to prepare a meal? There is, according to statistics, only 1 per cent of truly unreasonable people in this world, and they are not all in your territory.

Thus it goes in every branch of activity of a public utility company, for there is nothing done that will not prove of interest to the general public.

Publicity can be made a factor in the public utility business and a mighty big one, too. By publicity is meant reading matter in the news columns of newspapers, magazines, etc., and such pamphlets as may be gotten out in addition to lectures before civic associations, church societies and even before school children. Everyone of these mediums will prove productive of results as they have for other lines of business as well as for the few public utilities that have tried them out.

Publicity and the Labor Problem.

Incidentally, publicity will go a long way in helping to solve the labor problem that is confronting every company. First there is a matter of pride. Everyone likes to be identified with a company that is widely known for its progressiveness. Second, there is the advantage of bringing home to employees the problems that must be solved. When open acknowledgment is made that there exists a question ofttimes the answer will be forthcoming from among the employees themselves.

These are but a few phases of the power of publicity as applied to a public utility. Everyone is willing to admit that great damage can be done by unjust criticism that is leveled at public properties, but few have realized the great benefit that can be derived by constructive work. Or, if there is such realization, most of us have been too prone to say that such publicity would be useless in connection with utilities. But ever since the first newspaper was issued, people have been going to the product of the printing press for education and information. With a ready medium provided, it is for the utilities to take advantage of the situation and become a source of education and information. Certainly, it cannot be denied that there is much to gain and nothing to lose.

Creating News and Recognizing the News that Has Been Created.

There is just one side to the situation, however, that must be considered. It is that once a publicity campaign is started, it must be kept up. Only in this way will real results be attained and kept. Intermittent appearances in the news columns, and then usually to deny some unauthentic rumor, will not build for the condition which eventually will redound so greatly to the profit of the company. For, and here is the kernel of the nut, eventually results in publicity can be measured in terms of dollars and cents.

Two things are necessary, though, in making successful a campaign. They are first to create news, and, secondly, to recognize that news when it has been brought into being. That is where training counts and counts big. The recognition of something that will interest the community at large is a specially developed sense that can only be secured by years of training. Many companies turn this important activity over to the new business manager, and then are at a loss to account for the lack of results, or else condemn publicity as being worthless. That is hardly fair, for a real trial quickly would prove itself and would convince even the most skeptical of the worth of clever publicity.

Another side to this question is presented in the attitude that representatives of newspapers are received. Too often there is present an atmosphere of antagonism that quickly makes itself felt, and there can be only one natural result: The reporter or other representative is going to depart, if not an open enemy, at least a most inactive friend. A feeling of friendliness in the greeting, a frank discussion of affairs, and, in addition thereto, a placing of confidence in the newspaperman will create a booster of untold power.

Naturally, there are many plans that, should they become known too soon, would defeat the end sought, but even here there will be no violation of confidence if a newspaperman is trusted and made to feel that he is trusted. This attitude, in respect to many matters, might well be adopted so far as consumers are concerned; not on important matters, but on minor details, and the best way to accomplish this end is by means of publicity. Hammer home your story, back up your assertions with actions, and publicity will have accomplished for you just what it has for others. It's well worth trying, for it will bring that elusive and much desired thing: Consumer good-will.

Measuring Producer Gas

While it is a simple matter to measure the amount of gas supplied to a gas engine from a town's gas supply, it is a matter of some difficulty to measure the quantity of gas used from a producer or from a coke-oven or blast-furnace, owing to the fact that the pressure and temperature of the gas are not accurately determined. And yet for a complete knowledge of the performance of the engine a knowledge of the quantity of gas supplied is necessary. Two methods are available, however, both of which have proved satisfactory in actual service. The first is by means of the Pitot tube. The tube is inserted in the center of a straight length of the pipe so that the axis of the vent portion of the tube is parallel to the direction of the flow of the gas. The second method is to place a standard orifice between the flanges of two straight lengths of the pipe, and to measure the difference of pressure on the two sides, it being necessary only to have the proper ratio of orifice diameter to pipe diameter, and to have the orifice the proper shape in order to ensure accuracy. In both methods the difference of pressure must be accurately determined, one way of doing this being to lead the two pressures to the opposite sides of a bell float which is water sealed from the atmosphere, the position of the float being directly proportional to the difference of pressure.

Would Permit No One to Sell Industrial Gas Who Is Without Experience in Selling Domestic Business

C. M. Robert Divides Industrial Prospects into Four Divisions—Hotel and Restaurant Business Has Become the Gas Man's Own

Selling gas for industrial uses is very much like selling goods wholesale. A great many business houses sell both wholesale and retail. To conduct a successful wholesale department requires men who thoroughly understand that method of disposing of goods, and as a rule men should be employed for such a department who have had experience in the retail end of the business, men who have studied that branch of the business and look to larger things. This rule should apply to the gas business; no one should be permitted to sell industrial gas until he has first learned the retail, or, as we term it, the domestic end of the business, declared C. M. Robert, in a paper before the recent annual convention of the Pacific Coast Gas Association.

To be successful in the industrial field the gas salesman must apply himself in every possible way, and always keep abreast of the times. The gas companies are meeting with an exceptional demand for gas from all kinds of manufacturing concerns and it has been a trying time for the industrial salesman, who must frequently be on the job almost day and night.

There are some installations where the substitution of gas for other fuels would not be feasible, and the industrial gas salesman should use care not to take this class of business as it would ultimately result in a loss instead of a gain to his company. There has been a great deal of money wasted by gas companies in making installations where there was no possible chance for success on account of cost of operation. Such losses are unnecessary and with proper care and thought most of them can be avoided. The salesman should be equipped with sufficient knowledge so as not to overlook any possible profitable opportunities.

The manager of the New Business Department of the gas utility should see that the industrial department is backed up in every possible way. He should insist that trade journals be supplied to his men and that the men read them. Those who do not read these journals and keep themselves posted should be looked upon as slackers and treated accordingly.

Industrial Prospects in Four Divisions

For selling purposes, industrial prospects should be segregated in four divisions. First, house heating, water heating and storage systems; second, hotel, restaurant and bakery equipment; third, dryhouses, canning establishments and steam boiler equipment; and fourth, equipment for manufacturing metal products, treatment of steels, etc. I have put these different classes of industrial business in four divisions for the following reason. In large cities one man should specialize on one class of business, as there is so much to be learned by and expected of the gas salesman that it is almost impossible for him to keep up to date in regard to the entire scope of industrial business. Of course, in smaller cities, this will have to be done as best suits local conditions.

House heating is a problem which has given us more or less trouble. Until recently we considered that it was sufficient to sell an ordinary stove, which was kicked around and thrown away the following year because it did not give sufficient heat and emitted a bad odor—to say nothing of the resulting condemnation of gas as not being fit to use for the heating of the home. Times have changed. People are learning that there are scientific ways of handling gases, and modern gas installations are making headway as they never have before. The great trouble has been that when a consumer came to the gas company and requested information on this subject he was generally shown cheap and shoddy appliances, and the gas concern thereby missed an opportunity to increase the sale of its product. No gas company can afford to recommend—must less sell—any appliance that is not absolutely the best, and they should make it a rule that all appliances sold are vented, whenever possible.

Selling Fifty Gas Furnaces to Everyone that Burned Coal

I am going to tell you what has been done in Los Angeles with the gas furnace. A few years ago it was practically an impossibility to convince a consumer that he would not become a bankrupt if he used a gas furnace in his home, and I can remember when five or six of these furnaces were sold each season—with the comment that they could not remain on account of the high cost of operation. But as these furnaces were correctly installed and gave the users good service at a reasonable cost, the next year brought forth increased sales, and the following year still more sales, until gas furnaces sold in Los Angeles during the past season were in the proportion of fifty to one of the coal furnaces. The fact is that it is possible to heat a home as cheaply with a gas furnace or gas-fired steam boiler, all things considered, as, for instance, with coal at $12 to $14 per ton, the prevailing price on the Pacific Coast. In Los Angeles I have found that about 75,000 cu. ft. a year will heat the ordinary home of from eight to ten rooms. These figures are the result of a comparison of 25 homes of this description, and the average was slightly more than 70,000 cu. ft. There are many people who would use a gas furnace but do not care to go to the expense of buying a new furnace—or they may be in a rented house which is equipped with a coal furnace. In such cases we have converted these coal furnaces into gas furnaces. In so doing the industrial salesman must be very careful to explain to the consumer that the cost of operation of such a converted furnace will be more than a furnace designed for the use of gas—will average, in fact, about 20 per cent more. Although we made about 100 of these changes

last year I do not know of a single complaint on account of high bills, which shows the care we used in giving information. Every instance of a gas installation in a coal furnace should be considered a future prospect for a gas furnace.

It would not be right to close the subject of house heating without saying something about the gas-fired steam boiler. We have made in the past year 17 to 18 of such installations, which have been most successful, and there now are more than 100 of these boilers on our system. I do not know of a single complaint on account of poor service or high bills.

An installation made at the Georgelle apartments in this city, serving 36 apartments, with a total of 1,800 ft. of radiation, resulted in a monthly gas bill as follows:

	Domestic per 1,000 cu ft.	Hot Water per 1,000 cu. ft.	Steam Heating per 1,000 cu. ft.	Total per 1,000 cu. ft.
January	34.2	118.1	293.1	445.4
February	75.2	109.8	391.0	576.0
March	91.5	116.7	385.3	593.5
April	51.1	113.1	173.4	337.6
May	34.9	101.6	22.4	158.9
June	34.2	92.0	10.8	137.0

815 B.t.u. gas.

I am sorry that I cannot compare gas with oil in this instance because this particular installation was designed originally for gas.

Boilers have been installed for heating homes, clubs, cafes and store buildings, and gas has been substituted under many boilers which were designed originally for other fuels. This substitution has been a success, but I find the cost of operation is about 25 per cent higher, and consequently do not recommend converting such boilers into gas-fired except when the customer will not spend the money for a new boiler and is satisfied with conditions when explained.

Hotels and restaurants form a very lucrative source of revenue for the gas utility. This business is practically the same all the year round, and as a rule gas is preferred to any other fuel. As with every other commodity that is desirable, the cost seems to be the chief stumbling block, together with the quality and type of gas range required. The chef is an autocrat, and to please him is half the battle.

The Siphon Blast Range.

The siphon blast range has been quite an improvement over other types, and where they are used are generally giving satisfaction. However, most chefs prefer the brick-set or French range which is constructed for coal or oil and which, when converted to use gas, consumes more fuel than ranges originally designed for gas. The brick-set range is so preferred because of its heavier construction, and it is claimed that the bricks maintain a more even temperature. Because of the preference for this heavy range, and due to the fact, also, that so many of them are in use, I have been called upon to substitute gas for oil in a great number of instances. This is done by placing four burners in the end of the range, using 1¼ in. mixers with pipe nipples going through the end of the fire-box. The fire-box should be enclosed with firebrick and refractive clay briquets placed around the end of the burner to cause a radiant heat.

It is a time-worn custom among chefs to have the range top excessively hot, and finesse must be used to convince them that excessive heat is unnecessary. I find it good policy to use an excess of gas at the start and gradually reduce the range temperature from day to day until the proper heat is carried to do the work. Most oil burning ranges are connected up without a damper, and some are built to the flue so that it is impossible to place a damper in the vent. About the only way a damper can be installed in this type of connection is by removing a row of bricks from the flue and putting in a slide damper which is made with ordinary 20-gauge black iron. There is no set rule to govern the amount of flue space as this will vary according to draft velocity. An installation of this description was made in the Alexandria Hotel, Los Angeles, which comprised five 3-oven ranges and four bake ovens. These appliances formerly burned oil and the substitution of gas has proven most satisfactory. The chief engineer, T. S. Thompson, is a technical man and kept a strict account of the oil used in the kitchen. This amounted to 100 barrels a month, which cost them $1.57 per barrel, or $157. The following month's gas bill amounted to $330, yet we were able to show them a saving over operation using oil. The management is convinced that gas is a cheaper fuel. It might be interesting here to give a statement as to how this estimate was made.

Kitchen comprising one 2-oven brick-set range; five 3-oven brick-set range; one meat oven; three bread and pastry ovens.

Cost of Operation With Oil, June, 1917.

Used 104 bbls. of oil at $1.57	$163.28
Two firemen at $80 per month	160.00
Estimate cost steam to atomize oil	25.00
Average cost repairs	30.00
Board for two firemen	30.00
Total	$408.28

Cost of Operation With Gas, June, 1918.

	Per 1,000 cu. ft.
Total consumption main meter	644.0
Less sub-meters for other appliances	178.6
Total for ranges	465.4

At the following rate: First 5,000 cu. ft. per meter per month, 68 cents per 1,000 cu. ft.; next 5,000, 60 cents; next 15,000, 55 cents; next 25,000, 50 cents; all over 50,000, 45 cents.

Total cost of gas	$214.33
Half time repairman at $80	40.00
Half month board repairman	7.50
Estimated cost repairs, etc.	10.00
Total	$271.83
Cost of operation with oil, June, 1917	$408.28
Cost of operation with gas, June, 1918	271.83
Total net saving for month	$136.45

Where there is a kitchen boiler for hot water it is necessary to change the water-back. This is done by removing the old water-back from the fire box and con-

(*Continued on page* 326.)

Application of the Index Number of Commodity Prices in Adjustments of Gas Rates a Way Out of a Vicious Cycle

Evils Traceable to Dollar of Standard Weight Rather Than of Standard Value the Underlying Reason for Present Day Disturbances

By WARREN S. BLAUVELT
Detroit, Mich.

In the many attempts to cope with the problem of increasing prices and the high cost of living, there is little evidence of clear dispassionate thinking to determine the economic causes of the difficulty; but excessive energy is displayed in dealing with symptoms, and in the effort to make some individuals and corporations the "goats." But, unfortunately, such misdirected energy inevitably is worse than wasted, as those employed in such futile efforts are producing none of the commodities which would supply human needs, and generally interfere with the normal processes of production and distribution.

There are two underlying economic causes of advancing prices, namely:

First.—We have established by law, conditions which make it easier for many people to acquire wealth by limiting production, interfering with distribution, or wasting natural resources, than by assuming the hazards of productive industry, engaging in the service of distribution or fully utilizing natural resources.

Second.—We have established as the medium of exchange a standard weight of gold instead of a standard value of gold.

To deal with the first of these causes is beyond the scope of this paper; the mention thereof will have accomplished its purpose if it promotes thought and criticism.

All Suffer From Lack of Standard Value

All individuals and corporations engaged in useful service suffer from the lack of a standard of value, but public service corporations, whose rates are limited by Governmental agencies or franchises, inevitably suffer more from this cause when the value of the dollar declines than the merchant or manufacturer who can, at will, advance prices, limited only by competition, as costs increase.

The value of a dollar is its purchasing power. The power of the dollar to purchase all essential commodities in the proportion of their consumption, is less than half what it was in January, 1915; in four and a half years the value of the dollar has decreased one-half, and there is every indication that this decline in the value of a dollar will continue for an indefinite period, unless a standard value dollar is established to replace the standard weight dollar.

Our present dollar is a fixed weight of gold, 25.8 gr. Any reduction in the cost of producing gold, exceeding corresponding reductions in the average costs of production of all other commodities, or any decrease in the demand for gold relative to the average demand for all other commodities reduces the value, that is the purchasing power of gold. Both of these conditions have prevailed during the past twenty years. New processes for the recovery of gold have greatly decreased its cost of production and improved credit systems have reduced the demand for gold. Then the war created an unprecedented demand for other metals, fuels, foods, textiles and building materials, with no corresponding increase in the demand for gold. As a result the present value of 25.8 gr. of gold is just about 0.48 of its value five years ago. The dollar is worth less than half a dollar was in 1914.

Remedies That Make Condition Worse.

The wage earner was compelled to reduce his standard of living or demand higher wages. The business man was compelled to increase prices, or face bankruptcy. These effects are generally understood, having been discussed at length in the papers; but certain other results of the lack of a stable standard of values have not received the attention which their importance warrants. Savings bank deposits, bonds and all other promises to pay dollars, are worth less than half what they were five years ago. The decline in the value of savings has reduced the incentive for thrift; for people will not deny themselves the satisfaction of present expenditure, unless reasonably assured that by so doing, they will have greater satisfaction in the future expenditure of the money laid aside. The rapid decline in the value of the dollar, and the probability of its further depreciation is one of the main causes of the prevalent extravagance.

The Favorite Method of Establishing an Equilibrium

The decline in the value of the dollar introduces an additional hazard into every business transaction involving the time element; the building contractor adds an indefinite percentage to his price to cover probable increases in the cost of materials, wages and freight rates. The cotton grower reduces his acreage because he fears that he will not be able to meet his payrolls. The careful investor will not buy bonds except under the spur of patriotism or of an aroused public opinion, unless the interest rate is high enough to more than equalize the probable decline in value of 25.8 gr. of gold during the term of the bond. The cost of insurance against this additional hazard must be added to the price paid by the public served, if the service is to be continued or extended.

Apparently the favorite method evolved to re-establish an equilibrium between wages and prices is the strike; this interferes with production and thus increases prices and still further intensifies the evil against

which it is directed, namely, the decreasing value of the dollar. Apparently also the only method as yet evolved for many of the public utilities, where adequate rates have not been allowed, is to let the service deteriorate. This in turn increases the cost of carrying on business, enhances prices and so adds to the cost of living. It would be interesting to have a survey of the actual loss incurred by business men due to deteriorated telephone service. The delay in getting the right connection has so increased as to be a serious item of cost; executives cannot afford to make their own calls, so, after the right party is obtained, the line is held until the executive is notified, thus poor service involves not only the waste of the time of the public, but also a waste of the already adequate facilities.

One could go on indefinitely enumerating the rapidly increasing difficulties which are directly traceable to our lack of a stabilized standard of value, and to our foolish attempt to use a specified weight of gold as though it were such a standard.

To obviate these difficulties is not only possible but practicable; a dollar stable in value rather than in weight would accomplish the purpose. A plan for substituting a standard value dollar for the present standard weight dollar, was worked out in some detail by Prof. Irving Fisher of Yale University some years ago. His proposal was approved by economists, financiers and statesmen in this country and abroad; but it has never attracted the serious attention of politicians. Statesmen deal with causes and thus endeavor to produce permanent results; politicians deal with symptoms and thus hope to carry the next election. Politicians become statesmen when the people back home are sufficiently informed to support principles rather than persons or parties.

Obviating the Difficulties Resulting from Dollar Fluctuations.

Professor Fisher's plan is: "First, to provide for the official index number of prices; second, to adjust correspondingly the official weight of the virtual dollar on which the Government shall issue gold certificates to miners or redeem them for jewelers; in other words, to adjust the official prices of gold at which the Government stands ready to buy or sell at the option of the public. This then is the plan in brief—a plan virtually to mark up or down the weight of the dollar (that is, to mark down or up the price of gold bullion) in exact proportion to the deviations above or below par of the index number of prices."

The adoption of such a standard of value as contemplated by Professor Fisher, would obviate the difficulties resulting from the fluctuations in the purchasing power of the dollar. The time and energy now expended in trying to establish an equilibrium between wages and prices, between costs and rates, might be devoted to increasing production, improving processes and perfecting service.

To secure the adoption of such a standard, much public education is necessary; this takes time and effort; but the fact that the accomplishment of a useful task is difficult, is no excuse for declining to undertake it; to real men, such a feat is a summons to vigorous effort.

There is, however, a possibility for the public utilities to realize some of the benefits which would come from the stabilized dollar without an international agreement or an Act of Congress. To do this, it would be necessary first to agree upon rates for services which would be both adequate and equitable, and then to provide that such rates should be varied automatically with the index number. Many wage agreements have been made on this basis. It should be as easy to convince public utility commissions, and the public served, of the essential justice of such a plan, as it was to convince the boards of directors and the employees of the various industrial establishments who have adopted it.

A Ready Market for Bonds.

If this plan were put into effect, the companies enjoying its provisions should in turn make wage and salary agreements of like import with their employees. It is possible also that a ready market could be found for their bonds, if they contained a provision whereby the number of dollars to be paid as interest at each interest period, and as principal when the bonds matured, would bear the same ratio to the number of dollars calculated from the interest rate, and to the par value of the bonds as the index number at the dates of such payments would bear to the index number on the date the bonds were issued.

Such a plan as the above, if carried into effect, would relieve utility companies from the burden of frequent rate adjustments and would enable them to secure the necessary funds for their development. Also, should altered economic conditions cause the dollar to appreciate in value, rates and wages would automatically be lowered under such agreements, and the number of dollars paid to bond holders would be reduced.

Note.—The following publications may be of some interest:

"A Stable Monetary Yardstick, the Remedy for the Rising Cost of Living." Irving Fisher, Ph.D. *The Independent*, Sept. 26, 1912.

"An Unshrinkable Dollar." Irving Fisher, Ph.D. *The Independent*, Jan. 2, 1913.

"A Compensated Dollar." Irving Fisher, Ph.D. *Quarterly Journal of Economics*, February, 1913.

"High Prices; and a Remedy." Irving Fisher. *Review of Reviews*, September, 1919.

"The Making and Use of Index Numbers." Wesley C. Mitchell. *Bulletin No.* 173, Bureau of Labor Statistics.

"The Index Number Wage." Theodore H. Price. *Commerce and Finance*, New York, May 7, 1919.

Houses and Homes

America needs homes. In 1890 48 per cent of our people were home owners; in 1910 this per cent dropped to 45 and to-day it is estimated to be only 42. Home-owning going down—to what? To tenantry, absentee-landlordism, to slums, that disease of society which has been raging at the heart of the major European nations since Watts with his steam engine made it possible to centralize industry?

The stoppage of building during the war has left us a million homes short. That which has long been an industrial handicap has now become a national danger. The need of houses to stabilize the labor market may become a demand for homes to save a nation. Thus it happens that the most important thing to be said about industrial housing at the present time is to watch for a new point of view in approaching it. A new vision is needed.

When the Force of Co-operation Is Behind the Punch for Safety, the Fight for Accident Prevention Is Soon Won

J. F. Conner Contends There Is Nothing Extra Hazardous About Gas Plants — Accident Prevention Pretty Much a Case of Good Housekeeping and Employee Education

In view of the fact that during the past several years all phases of the accident prevention problems have been broadly and ably discussed by men and women who, in serious interest, have given much of their time and thought to the questions involved, there appears to be left little or no opening for further amplification, and in addressing you on the subject, "Preventing Accidents in Gas Plants," I fear that my remarks may not carry with them any new or constructive suggestions. With few exceptions, the accident hazards met in gas plants do not materially differ from those found in other industries where mechanical and construction operations are the rule, declared J. F. Conner, safety supervisor of the United Gas Improvement Company, in a paper presented at the Eighth Annual Safety Congress of the National Safety Council.

My conclusion in this respect is based on experience gained from a close acquaintance with such operations, receiving reports of accidents and investigating their causes, and from making accident hazard inspections in many gas plants.

Industry Has Inherent Hazards.

The industry has, of course, inherent hazards. There are certain zones in gas works where in the course of operation pockets of gas may accumulate and, with the admixture of air, serious explosive hazards may form. Precautions should be taken against such conditions arising. The ventilation, lighting and the lighting system of such zones are questions for consideration. Such places should be as well ventilated as conditions will permit. In the lighting system, approved types of keyless socket, vapor proof globe electric lamps with remote switch controls should be used, to guard against the possibility of the gaseous atmosphere being fired by an electric arc. Warning signs of size sufficient to attract attention cautioning against smoking and the carrying of naked flames in such zones, should be posted in conspicuous places.

Like precautions should also be taken to guard against dust explosions in coal crusher rooms and pits where the air may be heavily charged, especially while the crushers are in operation, with minute particles of carbon which may be ignited and exploded by contact with an exposed flame. Dust explosions, while infrequent in gas plants, have been known to occur frequently in other industries with disastrous results.

It may be unnecessary to state that all warning signs should be kept in clear, legible condition if any benefit is to be derived from their posting. The writer has found, in the course of inspections, instances of lettering on painted wooden signs having become illegible from exposure to weather, and enameled metal signs covered by accretions of smut and dust.

Emergency conditions may arise which will require working against live gas. In such instances, the workman should be protected by a suitable type of respirator. The same precaution should be taken when a workman is required to enter any gas-charged atmosphere and in every instance he should be under the clear observation of a person outside the danger zone, who should be prepared to render immediate assistance. Oil and other tanks in which gases are present should, where conditions will permit, be first purged by steam and well ventilated before entrance is made to such enclosure. Life lines can in such work be used to advantage.

Usually Well Guarded Mechanically.

Generally speaking, gas plants are usually well guarded mechanically. Occasionally, however, accidents occur on machinery due to guards being temporarily removed during repairs and failure to replace guards before putting the machines in operation again, or possibly to an exposure being considered too remote to warrant guarding.

A review of cases reported shows that the causes responsible for the greater number of accidents are due to the simple hazards found in all industrial establishments such as tripping, falling, slipping and lifting, protruding nails, to the use of defective hand tools, ladders, scaffolds and makeshift supports that give insecure footing, and other like minor hazards, and to disregard of instructions to wear goggles when engaged in work in which the eyes are exposed to flying particles or splashing liquors.

The safeguarding of machinery and the installation of other merchanical devices for the prevention of accidents is unquestionably a necessary measure in any well-ordered plant, but in many cases the guards cannot be made absolutely fool-proof, so that in the final analysis, the greater reliance for preventing accidents must be placed on the human agency. If we are to continue to look forward to a reduction in the accident frequency, greater efforts must be made to educate the workman to know the dangers that beset him, and others, from carelessness, thoughtlesness, and inattention on his part, and to arouse and maintain the accident prevention spirit in him.

Reaching the Workmen.

How we shall best reach the workmen by educational propaganda is a question of personal opinion. Reasoning with the men collectively is usually attended by good results. In obdurate cases, however, resort to individual approach brings the best results. We should not, however, be too hasty in censure of the workman for apparent indifference to safety. He possibly may be influenced by environment and be reflecting the attitude of his superiors to this important question. The problem, to my reasoning, should first be brought con-

vincingly to the attention of the man higher up, the man directly in charge of the operation. If he meets it, as he should, in a spirit of serious interest and by precept and example sets the standard for his subordinates, lets it be known that he is keenly alive to any failure or disinterestedness on their part to shoulder their duty, the indifference, if any, of the foremen and sub-foremen will quickly vanish and those in positions of responsibility will, figuratively speaking, be standing on their toes and showing greater activity toward preventing accidents. The interest they show is bound to be reflected in the workmen and with the environment of good housekeeping, a place for everything and everything in its place, which must of necessity be part of the program, there will come a subconscious awakening of the prevention spirit in the workmen and that is the dominating factor in preventing accidents.

The company with which I am connected is one of the pioneers in the first aid and prevention field. Its activity in this regard dates back some fifteen years. The education of its employees in accident prevention has been carried on by means of safety rallies including motion pictures, shop meetings including lantern slides. a house organ under the title of "Safety News," the use of bulletins, buttons and other measures that tend to instill, attract, and maintain an interest in accident prevention and in holding down the accident occurrences.

Teamwork as outlined means cooperation. When the force of co-operation is behind the punch for safety, the fight for accident prevention is soon won.

Turf Distillation

Turf, as a combustible, is well known, and in the surrounding districts in which it exists it finds ready acceptance chiefly among the poor classes, who greatly prize its worth as a cheap fuel. For several reasons, however, it is but little used in furnaces, etc., especially as its value as a calorific is about half that of coal. Nevertheless, owing to the threatened shortage of coal, due to various causes, turf, which hitherto has been regarded as an almost negligible asset for lighting, heating and drying purposes, is now looked on as a most valuable product. This is due to the fact that oil can be distilled from it.

Vast tracts of turbary or moor lands exist in various European and American countries; thus, Scandinavia, Russia, Germany, France, Ireland and Canada contain great quantities of this fuel. Russia alone has about 50,000,000 acres (?) of turbary, which yield annually about 4,000,000 tons of turf-bricks.

Obtaining Turf Oil.

Before the turf is cut, an operation which should be always carried out in fine weather, the turbary should, if possible, be drained, and afterwards the freshly extracted material should be left exposed to wind and sun. The cut turf is afterwards conveyed to specially-made machines—somewhat similar to those used in brick-making—wherein it is compressed, the moisture expelled, and it is then cut and fashioned into briquettes, and placed in a shed to dry. It is found that this manner of drying is far superior to artificial drying and gives better results.

Distillation is performed in a species of high retorts. The turf bricks, as dry as possible, are piled up in these retorts and are subjected to heat and pressure. From the bricks comes forth a certain amount of gas which can be utilized in heating the furnaces and the brick turf matter, after compression, is highly valued in metallurgical factories, owing to the fact that it contains very little sulphur. From the by-products of the compressed turf there are eliminated tar and ammoniacal waters. These waters, after treatment, give about 7 pints of methylated alcohol, 6 pints of sulphate of ammonia, and 18 pints of acetate of chalk per ton of treated and compressed turf. Thus, the expense incurred in compression is compensated for by by-products. From the compressed turf two oils are obtained, viz., paraffin and asphalt.

From the tar product of the compressed turf an oil is obtained which varies according to distillation; one a light oil and the other suitable for burning in furnaces, ec. The light oil gives excellent results in motors, etc., where internal combustion takes place, such as in Diesel sorts. The oil for burning in furnaces, etc., is like a turf coke, free from sulphurous matter, and thus it has great advantages for use in the heating of marine furnaces. It has, moreover, this superiority, that it causes no corrosion in the metallic parts of the machine, and that it makes the work of the stokers or chauffeurs much easier and less painful. As this oil does not give forth those dangerous sulphurous gasses which other oils give forth in burning, workmen are not exposed to have their health undermined where this oil is used. From the compressed turf a gas is made which yields about 2,000 to 3,000 cubic meters to the ton.

During the war this product has been in great demand, but for some time back Germany has established in the University of Hanover a laboratory for investigating the various uses of turf, especially its properties from a physical point of view. As a litter for stables and cow-houses turf has a special value, as it readily absorbs and contains ammoniacal deposits, so that this litter is one of the best manures. In greenhouses, etc., turf has many uses.

It is well known that turf has highly antiseptic qualities which make it of great worth in surgical and medical treatment. Thus, it is used largely and with better results, instead of hydrophile cotton in "dressings." A certain hospital in Paris used 2,000 kilos of hydrophile wadding daily during the war, and this, when cotton was so dear and hard to obtain, thus the expense was very great, while if turf dressing had been used the cost would have been greatly reduced and the cotton better employed. The turf for dressing needs special preparation, and Germany has been the country to utilize it most.

Turf-dust is used in many places with the best results in purifying dry sewage deposits and also drinking water. In Dresden and in Hamburg successful experiments have been made in the compression of turf, with the result that an excellent hard material has been obtained, impervious to water and fire-proof, so that it can be used in paving, railways, supports, etc. Turf has been tried in the fabrication of paper, pasteboard, etc., but the results have not given satisfaction. As packing material, turf-mould is of great value, especially for fragile goods.

Thus the turf industry is one which can give employment to various trades, and of present and future great importance.

Appearance, Disappearance and Probable Reappearance of the Gas Bag in English Traffic

To the Thoughtless It May Have Seemed that City Gas as a Competitor of Gasoline Was a Failure, a Wartime Expedient of Which Industry Was Glad to Rid Itself When the Emergency Had Passed—To the Expert Mind It Proved Itself and the Day of Its Re-establishment Is Looked Forward to as a Step in the World's Progress

By T. SINGTON

Five years ago, before Great Britain in rapid succession declared war on four Continental Powers, horse-drawn carts and wagons were rapidly disappearing from the streets of all the larger towns and motor-driven commercial lorries for goods of every description, 3-ton, 4-ton and 5-ton, were taking their place. No horse-drawn vehicle could compete with the commercial motor vehicle with its standardized chassis, 35 or more horsepower engine, say six cylinders of the widely advertised three or more commercial tonners. Unfortunately for them an important point had not been foreseen, they were all dependent on motor spirit imported from the United States and when, during the war, the whole of the available supplies were commandeered for military purposes by the British Government, the whole of this transport system collapsed. There was a rush on horses, but the supply was wholly inadequate and then some brilliant inventor hit the idea of substituting coal gas drawn from the street mains for motor spirits. Some trifling modification of the engine mechanism only was stated to be necessary and an air tight gas bag of any shape, cubic, pyramidal or globular. Forthwith there was a rush on gas bags, a new industry developed overnight, so to say, to supply an unprecedented and eager demand, and gas bags of every shape and color were seen careering down the street strapped to the top of every commercial vehicle, swaying, bulging and waving with every lurch of the vehicle and every gust of wind. The sizes varied from 150 cu. ft. upwards and the contents from the just filled to the nearly empty; in fact, no two were exactly alike. Gas bags became quite a feature of the street traffic. The consumption of motor spirit in Great Britain during the last peace year will convey some idea of the void which coal gas was expected to occupy; the imports amounted to nearly 101,000,000 gallons; now supposing that quantity to be equally divided between passenger motor vehicles, private and public and trading vehicles, then a demand for coal gas arose the equivalent of 50,000,000 gallons of motor spirit. That opened out an entirely novel and unexpected use for coal gas of which all gas companies hastened to avail themselves.

By No Means a Failure.

Now, another change has occurred due to the peace for which every one has been anxiously waiting for years; the Government no longer requires the motor spirit imported, there are unlimited supplies, and the disappearance of the gas bag from the streets upon the relaxation of the motor restrictions has been as sudden as its appearance. The thoughtless public at once conceived the idea that the gas bag had proved a failure, but a very little consideration will show that that is a mistake; it is more than likely that the resurrection of the gas bag will occur very shortly and that it will then return to stay and will, moreover, prove to be a dangerous competitor of motor spirit. The whole-heartedness of the abandonment seemed to suggest that as a fuel for motor engines, gas had been found to be a failure, but it is known from actual experience and from evidence within the knowledge of experts, who have made a special study of the subject, that coal gas was both admirably suited for this novel purpose and was an economical substitute for motor spirit. For the causes of the temporary disappearance of the gas bag little search is necessary. The essential cause may be summed up in a few words: the want or absence of distributive facilities; all experts now realize this all important point and recommend that the use of gas as a motor fuel should be encouraged. If the difficulties associated with the use of gas as a motor fuel are fairly weighed with the advantages, the latter predominate. Experts do not hesitate to state that having regard to the uncertainty in respect of the sufficiency of future petrol production and importation to supply the rapidly increasing British and world-wide demands, any relaxation of interest in the use of coal gas as a substitute would be contrary to the national interest. Experts assert that gas is a reliable alternative fuel, should any attempt be made by British importers to establish a monoply of motor spirit at inflated prices. Gas fuel they point out merits adoption as a commercial alternative to electric, petrol or steam traction, more especially for omnibuses and other commercial types of road motor vehicles including, it is interesting to note, tramcars; the average traction equivalent of one gallon of petrol being 250 cu. ft. of ordinary town gas.

Only Two Essential Difficulties.

When difficulties which confront the intending user of gas fuel are studied, it is found that there are only two essential ones: the container and the facilities or difficulties of obtaining fresh supplies of the gas. As regards the former it has been suggested that gas bags might be superseded by semi-rigid or rigid containers; flexible containers were all very well during the sudden and unexpected emergency which arose during the war, but the experience has shown that they possessed obvious inconveniences, which most commercial users and practically no private motorists would tolerate during peace conditions, while spirit, whether benzol or petrol, could be obtained. When a nation is at war, especially in a dozen localities against formidable enemies, steel

containers cannot be expected, but when peace has been resolved, when engineering works are only half employed, when exports are dwindling and unemployed numerous, light, strong and ductile cylinders can be readily made, should demand arise. A wide range of evidence is available of the practicability of cylinder containers.

Fuel Replenishment.

The unsightly gas bag bulging to the right, to the left, then to the front and to the back is one of the weak points of the gas versus petrol system, it must be self-evident that if a substitute can be found half the objections to the use of gas have been eliminated, its popularity may be restored. Substitute metal cylinder containers for woven gas bags and half the battle is won. Gas in metal cylinder containers offers two advantages: convenience and economy, both tempting to the trading community. An expert suggests as to the cost of gas, the price of which varies from say $0.50 to $0.75 in Great Britain per 1,000 cu. ft., that the price works out on the average to an equivalent of $0.14 per gallon for petrol.

In order that gas may be able effectively to compete with benzol for motor truck driving it is essential that facilities should be provided for drivers to obtain fresh supplies, and it is for those engaged in the gas industry to provide these facilities in convenient localities, well known to every driver, which could, of course, be relied on. In large towns and suburban districts with gas mains in every thoroughfare, there can be no difficulty, and many trading vehicles going a periodical round are confined to such thoroughfares where fresh supplies could always be obtained.

But in country districts conditions are less favorable. The supply of gas could not be obtained in villages where there is no gas plant and use lamps or have harnessed their streams for production of electric power, which, to quote an expert, those exceptions would count for nothing if the drivers took precautions beforehand. A good business man, knowing what would be wanted and having a free hand, or at all events the active cooperation of gas producing concerns, could soon organize a satisfactory distribution system all over the country where motor vehicles were likely to travel. He could lay down at every gas works and conveniently placed garage in every town and village a pressure feeding plant with a meter. Any vehicle coming in for a supply would have its containers charged, the charge would be recorded by the meter, and the driver could pay proportionately at the rate per thousand obtaining in that particular town or village. Where the gas was obtained at a garage the garage would pay the gas department in the ordinary way and perhaps be allowed a special discount. The system outlined is clear of all complications and could easily be worked; it is as every expert will allow certainly practicable. This point of distribution is the essential one; when that has been overcome gas bags or containers will again become popular. All systems of fuel supply, whether liquid or gaseous, depend for their success upon distribution. To state it broadly, the supply must be obtainable everywhere, where travel is possible. Petrol companies make a special point of this to attract and serve the public; this and the fact that they also provide convenient containers in the shape of two gallon tins is the secret of success.

It is an example that those who are pushing the use of benzol are endeavoring to emulate, and it is one which must be followed in the case of gas, and could fail only in remote places where there are neither gas works nor garages, but in such localities there would be nothing to attract traffic and consequently no demand.

The gas industry has this important development entirely at their disposal, given a suitable container and given a convenient and reliable system of distribution, then it is only a question of time for gas driven trading vehicles to drive all competing forms of traction off the road, as none of them could successfully compete with it, nor offer users superior advantages or conveniences.

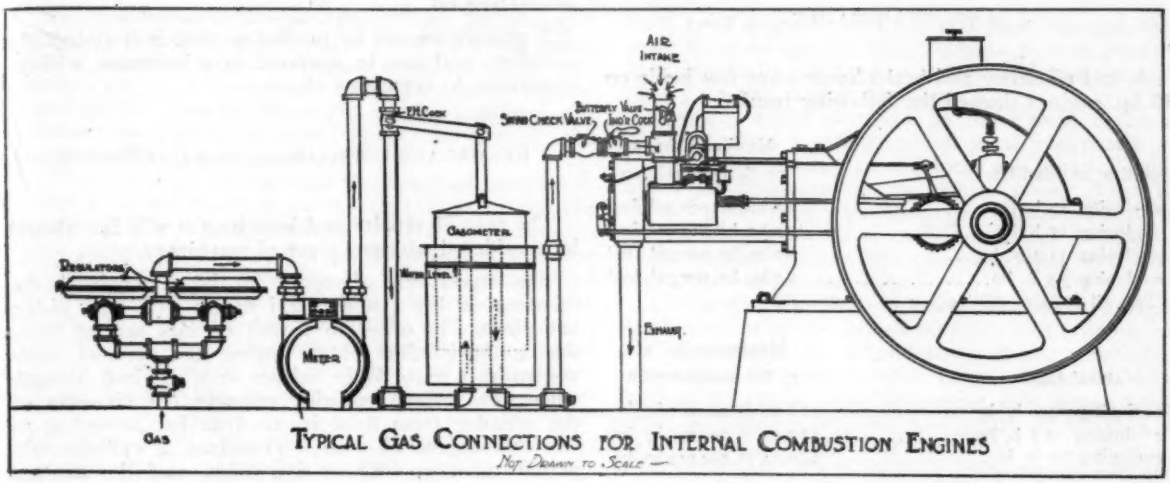
Possibilities of Gas Turbines

The case for the internal-combustion turbine is not hopeless. Taking such working temperatures and pressures as can be realized in practice, a theoretical energy utilization of about 67 per cent would be obtained. The compression does not take place within the explosion chamber, but must be furnished by an outside compressor. The compression work is increased further on account of delivery work, theoretically by 40 per cent. Practically on account of the many sources of inefficiency the increase is greater. Even with large units, the efficiency of the turbo compressors is relatively low, and turbulence losses must also be allowed for. The efficiency of the turbine wheel, furthermore, cannot be assumed to be higher than 60 per cent, so that the theoretical figure of 67 per cent is reduced to a practical one of 13.8 per cent, which is less than one-half of that of the modern internal-combustion reciprocator. The best-known application of the turbine principle to internal combustion work in the past is the German turbine, the Holzwarth. Mechanically, this turbine was a success, but to energy utilization, could not be expected to reach a higher figure than 13 to 15 per cent. Holzwarth proposed later to use an exhauster, driven by exhaust raised steam, to draw the gas into his combustion chamber, and in such a way an overall efficiency of 20 per cent may be obtained, which, in comparison with present-day turbine practice, does not promise well for the future of the explosion turbine on such lines.

A French development, that of Armengaud-Lemale, was successful up to this point. These gas turbines, while unsuccessful commercially, due to their efficiency for power production, have been fitted in quantities to drive torpedoes by utilizing compressed air. The weight of this engine works out at 1.3 lb. per b. hp. For aeroplane driving, where weight is of first importance, such prime movers have been considered, and Rateau is responsible for an interesting turbine, which utilizes the velocity in the exhaust gases of the reciprocating Aero engine to drive a turbo compressor to supply under pressure the charge of air and petrol to the main reciprocating engine, so compensating for the reduction in density of the air at high altitudes. As to whether such an auxiliary is a commercial proposition depends entirely upon the ratio of the extra weight required to the extra power gained.

Gas Engine of To-Day No Longer the Uncertain Quantity It Once Was

F. H. Bivens Asserts Any Make of Four-Cycle Engine in Which Charge Is Ignited with Electric Spark Can Be Equipped to Use Gas at Nominal Cost—Simplicity of Change Back to Liquid Fuel



TYPICAL GAS CONNECTIONS FOR INTERNAL COMBUSTION ENGINES

Not Drawn to Scale

GAS CONNECTION MADE SO EASY CHANGE CAN BE MADE TO OIL FUEL IF DESIRABLE.

The gas engine of to-day is no longer the uncertain quantity it formerly was, declared F. H. Bivens in a paper on the "Use of Natural Gas for Power in Gas Engines," presented at the recent annual convention of the Pacific Coast Gas Association. Equipped with a magneto, the modern gas engine starts when it is needed and runs until it is shut down.

Fully 90 per cent of the troubles with the older gas engines was due to ignition, and practically all of the remaining 10 per cent was fuel or fuel supply, so with a good magneto, ignition troubles are ended and with gas fuel troubles are ended.

Connecting for Natural Gas.

Any make of a 4-cycle engine in which the charge is ignited with an electric spark, can be equipped to use natural gas at a cost not in excess of $2 per horsepower for engines of 5 to 10 hp.; $1.50 per horsepower for engines 15 to 35 hp., and $1 per horsepower for engines over 60 hp.

In practically all cases excepting where a regular gas head and gas intake valve is installed, the gas is taken into the cylinder through the air-intake, using a cross, in the bottom and one side of which are placed butterfly air valves, so a perfect air adjustment can be secured, reducing the area of the other side of the cross to one-fourth of the area of the intake provided on the engine, to which the gas is connected, using a swing check valve to close off the gas during the exhaust, compression and firing strokes, an indicator cock for the convenience of the operator, and a small gasometer of 1 to 3 cu. ft. capacity, according to the size of the engine.

If the natural gas connection is thus made, the engine can be operated on liquid fuel by closing the gas valve and opening the liquid fuel valve, for the oil connections have not been disturbed, and full area of air intake can be opened.

Compression.

With some engines, particularly when the compression was very low, in changing to use natural gas, it was found necessary to increase the compression to develop the full horsepower. This was accomplished by securely fastening a plate on the piston head, or by lengthening the connecting rod, forcing the piston farther back into the cylinder and lessening the compression space.

The average compression pressure for liquid fuel is from 65 to 85 lb., while the best results are obtained when using natural gas, with compression pressures from 110 to 125 lb.

The proportion of compression space to piston displacement, in engines built for liquid fuel and provided with water injection, is from 30 to 35 per cent. For natural gas the space can be reduced to 22 per cent, but in practise about 28 per cent clearance brings good results and require no water injection.

Ignition.

With liquid fuel the time of igniting the compressed charge is 30 to 40 deg. Fahr., before center, and with natural gas the time must be advanced to fire 35 to 45 deg. Fahr., before center.

For igniting liquid fuel, the make and break spark

is the more reliable and practical, and for natural gas the high tension jump spark gives far the best results. Of course, the make and break spark can be used.

Magnetos for production of both high and low tension systems, have taken practically the entire field. Where the oscillating high tension magneto is employed, no complications such as batteries, switches, coils, cut-outs, etc., are needed; no switch to forget and ruin a battery.

Cost of Operation.

A fuel efficiency and brake horsepower test made on 15 hp. engines showed the following results:

Gasoline or Distillate.	Maximum hp. at 75 lb. compression.
Developing 17 b. hp.....	8.8 hp. hr. per gal. fuel
Developing 15 b. hp.....	10.0 hp. hr. per gal. fuel
Developing 11.2 b. hp.....	9.7 hp. hr. per gal. fuel
Developing 7.5 b. hp.....	9.0 hp. hr. per gal. fuel

Top oil reduces efficiency 5 to 12 per cent.

Natural Gas.	Maximum hp. at 75 lbs. compression
Developing 14.9 b. hp.....	12.0 cu. ft. gas per hp. hr.
Developing 11.2 b. hp.....	12.3 cu. ft. gas per hp. hr.
Developing 7.5 b. hp.....	14.0 cu. ft. gas per hp. hr.

Natural Gas.	Maximum hp. at 115 lb. compression
Developing 16.8 b. hp.....	9.8 cu. ft. gas per hp. hr.
Developing 15.0 b. hp.....	9.8 cu. ft. gas per hp. hr.
Developing 11.2 b. hp.....	11.0 cu. ft. gas per hp. hr.
Developing 7.5 b. hp.....	12.0 cu. ft. gas per hp. hr.

Larger engines will show about the same fuel consumption per horsepower hour, while engines of less than 10 hp. will show larger fuel consumption, as for example, a 3-hp. engine developing 3 hp., 75 lb. compression, will require 16.5 cu. ft. of gas per horsepower hour.

It has been our experience, taken from many engines under various conditions, that as an average, they will develop a horsepower hour on 12 cu. ft. of natural gas.

Using the 12 cu. ft. per horsepower hour as the basis, and assuming a rate of 50 cents per 1,000 cu. ft. for the gas, the following is the cost per hour of developing power with a gas engine.

Gas.

	Cu. ft. per hour	Cost per hour at 50 cents per 1,000
10 horsepower	120	$0.06
20 horsepower	240	0.12
30 horsepower	360	0.18
40 horsepower	480	0.24
50 horsepower	600	0.30
60 horsepower	720	0.36

The generating of electricity in small quantities for the charging of storage batteries, lighting and running elevators in business blocks, is made possible, and at a very small cost per kilowatt hour with the gas engine.

Gas Engine Can Be Operated in Basement Without Annoyance to Occupants Above.

By observing with a recording watt meter, several places that were generating electricity with gas engines, we were able to determine the average cost to be 1.65 cents per kilowatt hour, assuming a rate of 50 cents per 1,000 cu. ft. for the gas and 60 cents per gallon for lubricating oil.

A gas engine can be muffled so that it is practically noiseless, and can be operated in a basement without annoyance to occupants above.

Repairs and Depreciation of a Gas Engine.

The cost of repairs and how long it will last should be considered with any piece of machinery.

The largest item of repairs on the gas engine is the reboring of the cylinder and fitting with new piston and rings. In order to permit of this several times during the lifetime of an engine, the cylinder walls are made 3/8 in. to 5/8 in. thicker than required strength when new. Each reboring enlarges the diameter of the cylinder from 3/32 in. to 5/32 in., according to size and degree of wear. Therefore, a cylinder will permit reboring four or five times, and the average cost of each reboring and fitting with new pistons and rings is about $7 per in. of diameter of the cylinder, or approximately 5 per cent of the cost of the engine.

Running on natural gas and with proper lubrication in the cylinder will not require a reboring more than once every five or six years.

The other wearing parts of an engine are very few, so with reasonable care the total cost for all repairs, including reboring, should not exceed 3 per cent of the cost of the engine per year.

Since the cylinder walls the only wearing part which cannot be replaced at a very nominal expense is constructed to last 20 to 25 years with reasonable care, an allowance of 5 per cent a year should be made for depreciation, making an annual fixed charge of 3 per cent for repairs and 5 per cent for depreciation or a total fixed annual charge of 8 per cent.

Engineer or Attendance.

The cost of attendance to operate an engine using natural gas, should not be more than for an electric motor. Neither an engine or motor should be allowed to run more than 10 or 12 hours without attention. All engines can be equipped with oilers of sufficient capacity to last 14 to 16 hours, and it can be governed to a certain speed. Should the belt break releasing all load, the engine could not run away and damage itself.

The greatest possible chance of damage to an engine is in overheating, should the water used for cooling stop circulating. This possible chance can be eliminated by the use of any one of the several types of automatic devices made to operate by the circulating water, should it become too hot or stop flowing, it will break the electric contact and stop the engine.

True Industrial Field Lies in the Hands of the the Average Consumer and Not with the Largest Factories

H. M. Crawford Shows that 17 Per Cent. of Gas Company's Gas Sold Is Industrial—53½ Per Cent of This Used for Preparation and Production of Foods

H. M. Crawford gets his figures from the books of a gas company that sells eight to ten million cubic feet a month to one customer, a shipbuilding concern. Yet, in no uncertain terms he asserts the industrial field lies in the hands of the average consumer—the baker, the laundryman, the printer, the meat and fish people, and so on.

The use of gas in the heat treatment of food products is so universal in nature that it saturates the territory of every gas man, he declares, for example, in a paper presented at the recent annual convention of the Pacific Gas Association. The preparation of foodstuffs includes the bakeries, the canneries, the meat and fruit markets, the hotels and restaurants, candy factories, creameries and many others. Some gas is used in all of these branches and it is possible to use it on a large scale in all of them.

Business That Does not Run Into Millions Not Worth While?

During the war it was customary for all of us to think of industrial gas as being used only for great factories, until it began to look as though business was not worth while unless it could be counted in the millions of feet of gas; and we cannot lose sight of the fact that the curtailment of these big industries may cripple our new-business statements at some future time, so too much emphasis cannot be placed on the fact that the true industrial field lies in the hands of the average industrial consumer and not with the largest factories. The consumption of the small shops, such as bakeries and other food-production branches as mentioned, is not individually great, but they constitute the real backbone of the industrial gas business. The income from these places is steady twelve months in the year, and, owing to their number, the diversity factor is good and their business as a whole is secure.

17 Per Cent of the Accounted for Gas Industrial.

These average consumers are to us what diversified investment is to finance. The fact that the small industrial consumer pays a relatively higher rate than the big factories increases the total revenue from this source and adds to its attractiveness. In our eagerness to secure individually large industrial business we must not forget the value to us of these small bakeries, restaurants, etc., which are present in the territory of every gas man. In order to substantiate the statement made that they occupy a place of great importance in the gas industry, it is necessary to know what revenue is received from industrial business and how it is distributed. Evidence of this kind is obtainable and is presented herewith for consideration.

In the past receipts from industrial gas business have been dumped into the coffers of the gas company to make up the total revenue and no plan has been generally adopted which would automatically segregate the industrial sales.

Recently a gas company on the Pacific Coast decided to adopt a system which would segregate and classify that portion of the total gas revenue which could be attributed to industrial sales. This was done by carefully analyzing the industrial territory and making a record of each individual installation; this record indicated the gas consumed by months and other important data.

The total industrial business was then divided into classes, each being totaled monthly and summarized. This enabled the management of the company to determine the exact status of the industrial situation at all times. The industrial sale of gas for the first six months of 1919 was found to be 17½ per cent of the gas accounted for.

The following is an outline showing the industrial classifications in the territory referred to, showing the class of business and the percentage to which each is entitled of the total industrial sales. They are listed in the order of importance:

Class	Percentage of Industrial Revenue
Restaurants	27.20
Shipbuilding	9.85
Hotels	8.32
Bakeries	6.30
Laundries	6.25
Printing	5.08
Coffee	4.55
Candy	4.37
Tin and enamel	3.61
Varied industries	3.46
U. S. Government	3.40
Automobiles	3.34
Institutions	2.70
Glass	2.60
Hospitals	2.46
Electric products	1.51
Meat and fish	1.35
Paper and leather	1.30
Municipal	1.27
Fruits and vegetables	1.08
	100.00

Upon analyzing the tabulation we find that gas used for the preparation and production of foods constitutes 53½ per cent, or more than one-half, of all the gas sold for industrial purposes. Although the district referred to contains one of the largest shipbuilding plants on the Coast, which uses from eight to ten million feet of gas every month, still the total industrial sales attributed to shipbuilding are only

10 per cent, while the total sold to restaurants alone in the territory amounts to nearly three times as much. The bakeries and candy factories combined produce a greater revenue than shipbuilding, and the total of all food-production branches exceeds it by more than five times.

"The Butcher, the Baker, the Candy-Stick Maker."

This complete analysis of industrial territory shows conclusively the value of the baker, the restaurant man, the candy maker and other small gas users. Truly, they constitute an industrial army; just as is the case with our modern armies of war, their importance is in proportion to their numerical strength. It is only necessary to state that the average income per meter for industrial sales in the territory referred to is $600 per year to fully visualize its value to the industry as a whole. It is probable that the average gas territory on the Pacific Coast will compare well with the territory on which statistics have been quoted.

Concerted Action.

Having shown the extent to which the small industrial business has been developed and its value, it remains to propose some plan to exploit this business. In this all of us can take a lesson from the farmers, who have achieved a national organization among themselves and have successfully marketed their products in the face of the greatest difficulties. They have accomplished this by co-operation.

The gas industry knows the value of concerted action, and it only remains to apply it now to our industrial departments.

Did it ever occur to you, when you were endeavoring to solve an industrial gas problem, that there were members of this association who had grappled with that exact problem?

It is possible that some of us may be endeavoring to solve the same problem at the same time, and if we could only get together with the other fellow we might find that he was further advanced than we in the solution of that problem and we might benefit greatly by co-operation with him and save a great duplication of effort.

Our trouble in industrial work is that we have a succession of problems to solve and we have all been working at it individually instead of collectively.

We of the Pacific Coast have our own local competitive fuel conditions, and we are therefore dependent mainly upon data which are strictly applicable, and thus we must prepare ourselves.

Every man interested in selling fuel gas is hungry for data pertaining to industrial applications, whether he is interested in a small community or in a large community.

Everywhere you will find men asking for new operative costs and methods and other detailed information.

Each of us has some figures on our own local installations with which we are thoroughly familiar. Just imagine what a rich source of information it would be if all of this data could be gathered through some collective effort and made available as a whole to each individual gas man for his personal use.

Companies employing many fuel engineers have the advantage of large and diversified territory; they have opportunities, therefore, to employ new methods continually and watch the results therefrom.

Let them pass along this information to the other fellows—the opportunity to serve the cause is in proportion to the sphere of operations.

This would be real co-operation among industrial fuel men, and if contributions were made by the many competent industrial men we would be able to furnish a collection of data representing the best abilities and it would no doubt be of great assistance in promoting the use of gas on the Pacific Coast.

Not Easy to Obtain.

Like everything else worth having, industrial fuel business in all districts is difficult to obtain; it requires continuous effort, backed up by a full knowledge of what is being done elsewhere along the same lines.

The business secured, however, by painstaking and relentless endeavor will pay many fold. An important part of this effort lies in maintaining the business which has already been secured and perfecting it by consistent service to such a point that it will automatically recommend the use of gas and assist in the production of additional business.

A satisfied consumer is the best possible advertisement. Illustrating the importance of cultivating business in hand, the Government sold war insurance to nearly four million men on terms which were considered highly attractive to the individual. The War Insurance Committee stated in a recent report that three-fourths of the men had failed to keep up payments, and attributes this colossal failure to lack of publicity and agency solicitation.

The Government failed to apply principles of salesmanship and maintenance, and so three million boys of Uncle Sam have forfeited the benefits provided for them. Good business held is more valuable than new business. The revenue produced from industrial gas installations justifies a service extraordinary, both to hold the business and to extend its use.

In the past some of us have employed more or less hit-and-miss methods in securing industrial consumers. Let us now analyze our territories carefully, advertise the fact to the consumers that we are in the business, take the best possible care of our present consumers, and furnish each other, under some co-operative plan, full information as to our results. The very fact that we get information as to the other fellow's activities will stimulate us to greater efforts.

Industrial gas has come to stay; it will eventually become a great force in the gas business. Already the sales of gas for industrial purposes are climbing into billions of cubic feet, and still the end is not in sight. In unity there is strength. Let us get together and extend our hands to each other as brothers in this great work; let us all pull together and jump right in with a view to literally shaking the plum tree, and the result will be one of the biggest boosts that the gas industry has ever witnessed.

American Gas Engineering Journal

SIXTY-FIRST YEAR

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As the Journal Views It

The Open Door

A greater number of its friends and subscribers than ever before in its sixty years' history will be within easy reach of the offices of the AMERICAN GAS ENGINEERING JOURNAL during the next week.

As always, the door is open to them, their welcome is assured. The proverbial bottle that the graybeards tell us once was here is here no longer.

Times have changed. But not friendships, except through death.

Whatever aid or assistance that the JOURNAL can offer to visitors to whom what is our home is a strange place is offered without reservation. Those of the office force who are not absent in attendance upon convention matters will be glad indeed to welcome such gas men as may find their way to 150 Nassau Street, Fourteenth Floor, and to do anything within their limitations to meet any wishes they may have brought with them.

Something to Think About

In putting together this issue on the eve of the first annual convention of the American Gas Association the aim of the editors of the AMERICAN GAS ENGINEERING JOURNAL has been to bring as many new ideas on the widest variety of problems at present vital to the gas industry as time and effort could provide.

The table of contents in the next column will reveal their variety. They encompass rates, publicity, industrial fuel, safety, merchandising, use of city

gas as a motor fuel, etc. There is some new thought advanced in each and every article. It was such factor that determined whether or not the article should appear in this issue or another. A second factor of equal importance was the requirement that he who supplies the thought should know whereof he speaks.

There is a rich variety of food for thought in the contents of this issue; a fertile field for discussion.

Whether or not he into whose hands it comes is in attendance at the convention, we feel certain he will profit through a careful reading of the suggestions offered.

Perhaps Behind the Times in Some Things, but in Others Decidedly Not

One cannot fail to be struck with the frequency with which the gas man in his writings stresses upon the importance of reading the trade journals of the field.

In other lines, many of them professedly much more progressive and alert than the gas field, they are just beginning to appreciate the value of the pertinent trade paper in their work. They hail this new understanding almost as a discovery.

To the gas man his trade paper has been almost a religion for more than half a century. And he has been loyal to it.

There are few big gas men who confine their reading to the gas journals of their own country. The English gas journals have a considerable circulation in the United States and the American journals, vice versa, in the British Empire.

The gas man has been strong in his likes and prejudices among the journals. One prefers this, another that. To him they have been and are a vital issue to be boosted, argued over and condemned —but never unsupported, either in co-operation or financially.

Were all other proofs lacking, his attitude toward his journals would be proof sufficient of the gas man's essential common sense.

A gas journal honestly conducted, yet without value to the gas man—a value much higher than the annual cost of the most expensive—would be impossible. One pertinent suggestion, one painting of a minor economy that may be effected yet which had not hitherto occurred to mind, may mean a saving or an earning to the gas company that will mount up to thousands of dollars.

And his attitude, his live interest in his journals, is an assurance to the gas man that they will be of high quality. His attitude is an encouragement and inspiration to those who conduct them, and his active co-operation and contribution would make them of value even if their editors didn't themselves know how.

Is Vast Accumulation of Wealth a Menace?

When one gets to that point in the accumulation of wealth where despite expenses and even income and inheritance taxes there yet remains a constant accretion of various millions of dollars a year, we are presented, on superficial reasoning, a most fearsome picture. Conceivably in the course of some few centuries all the wealth of the world might be accumulated in one family.

But when we think a second time we realize that such a possibility is the silliest manner of fallacy that one may possibly indulge himself in.

In the first place, no one who has intelligence enough to accumulate a million dollars or a billion, as the case may be, would be so blindly stupid as to aspire, either for himself or his eventual progeny, the whole wealth of the world.

The protection of private property is based entirely upon the consent and good-will of all society.

When I travel to the city with my new suit of clothes, my couple of dollars in the pocket, my fountain pen and my penknife, I am tolerably certain of not having to part with any of it involuntarily, because my neighbors employ countless policemen, sheriffs, etc., to protect me in my possession. The reason my neighbors are so kindly in their consideration of my ownings is that they, too, have something to lose and want my good-will in protecting what is theirs.

But should the time ever come, as it never will, when the very, very few possess and the overwhelming majority do not, then it is certain that the tenure of possession will be very slender indeed.

On the principle of "a half a loaf is better than none" no human being of normal intelligence, even though entirely selfish, desires any abnormal possession of wealth for his progeny. The great efforts and expense those who have already approached this point go to to get rid of their surplus, usually in a way that is a positive benefit to humanity, is ample evidence of this.

In the second place, in the due course of nature families multiply. This in itself would serve to act as an equalizer. It would be an optimistic billionaire indeed who would feel assured that every one of his grandchildren twenty-five times down, even if the principal were handled with normal prudence, will be possessed even of a million dollars.

And again the fact remains that in the course of history there have been innumerable vast accumulations of wealth. Where are the descendants of all those magnates? The present-day vast fortunes are of comparatively modern origin.

It is all a cycle and always will be, and the fact remains that the opportunity for the penniless of to-day to die rich is just as great or greater than it ever has been in the past.

This Convention—What Will It Mean to the Gas Industry?

Days Ahead When No One Will Think of Heating His Dwelling Place with Solid Fuel When It Is a Toss-Up Whether the Motor Vehicle that Passes Has Obtained the Fuel that Runs It from the Bowls of the Earth in Liquid or Solid Form, When the Wheels of Industry Will Be Run by Gas and There Will Be Few Heat Treatments that Are Not Made with It, When Even the Field of Artificial Illumination May Again Be Practically a Monopoly of the Gas Works—Will the Programs Inspired at This Convention Be the Means of Bringing These Days Nearer or Will They Be Such that Progress Will Be Back in a Few Years More Than Can Be Recovered in a Decade

In the midst of social unrest, high prices in conjunction with a generally inflexible rate system and inadequate income, with plants in many cases inadequate and money almost impossible to get to extend them, the American Gas Association foregathers in its first formal convention.

Many will come, many will talk; we hope as many will actually think and consider.

We all know that eventually there will be no industry in these United States that will be more important than the gas-supplying industry.

It will be the most exclusive fuel source for all industries.

Possibly it may be the resource that will enable development to continue in the automobile, the motor truck and airplane and airship fields at the same mushroom rate that it has in the past.

Most homes and business buildings will be heated by gas.

Gas engines in the basement may possibly generate the electricity that lights big buildings or buildings wherein a considerable number of people are grouped.

It may be the foundation upon which a vast dyestuffs industry is founded.

It may do away with urban garbage and ashes collection and disposal as we now understand them.

These are but the obvious possibilities of development. They are more or less interdependent.

The accomplishment of any one of them within a short space would overwhelm the biggest gas company we know of.

It is sane to think of such things as these as the target at which we may legitimately aim. It would be demoralizing to attempt to attain them within a very few years.

When the average pauper sees a short way ahead of him relatively vast wealth he quite often begins to spend recklessly the meager bird he already has in the hand. And the affluence quite frequently doesn't get to him quick enough as a consequence to spare him some pretty considerable intermediate distress.

We in the gas field are liberally endowed with expectations.

We have done a great deal toward creating a better feeling toward us on the part of our consumers. We have some very ambitious plans in mind which will hasten this end materially.

When the public believes in us we will be able to get its concurrence in ideas we have in mind that will put the gas industry in a more stable condition and will thereby be of real benefit to the consumer. But it may be that a comprehension of the idea we have in mind will require technical explanations that we could never hope to make clear to a layman public. If it concurs with our idea at all it must obviously do so through faith in us—a confidence that the gas company would not father the

plan at all if it was not what it purported to be—and not on the basis of understanding.

There will be many plans, advantageous both to the public and the gas company, offered at the forthcoming convention. We, as gas men, understanding fully, will agree they should be adopted.

Then will come the question: Should we seek to have them adopted?

Let us say John Jones suggests the establishment of a universal 525 B.t.u. standard. A large number of us believe this would be really an economical standard both for the consumer and the gas company.

What would be the result of our prematurely seeking to impose such a plan on the public?

If it trusted us explicitly it would take our word for it that it is right.

But does this condition exist?

We would all rejoice if it did. But few of us believe it does.

The reaction would be a quite general suspicion that the gas company, up to its old tricks, was trying to put something over again.

The fewer suspicions we engender, justly or unjustly, the better we will be off. What is manifestly necessary, of course, must be done. The adoption of a B.t.u. standard at the time gas companies generally pressed for it was a virtual necessity.

Even though public suspicion was engendered, as it actually was and still is, through their activity in its behalf, it was something that had to be.

But there are changes and reforms that are still merely desirable. Conditions are not really unsatisfactory as they are.

We should make haste slowly in seeking these—give our Good-Will developers a chance to further develop the public's faith in us.

Upon Good-Will a great deal depends. And we have formed an Advertising Section in the American Gas Association to direct us in developing this.

At present this section is in the formative stage. Perhaps at the convention it will be formally formed.

Those who have advocated it will be ambitious.

They have promised a great deal—wonders—and they will want to speedily show us results.

And the consequence may be a disproportionate expenditure to the good attained.

Good-Will in the gas field just now is the big thing.

Many companies are already attaining it rapidly by means that have stood the test of time. Let them tell us how they are doing it and start off along these proved lines so progress may not be delayed.

Let us frown upon any attempt to hasten the Advertising Section into undertakings it is not prepared to adequately and competently discharge.

Give its personnel a chance to get their bearings, to study out their problem. Then, when they are ready, give them all the backing they ask for, financial and moral—if it is possible—and let them go to it with all vim.

There is a vast chance to fritter resources in money and energy in advertising. Do not let us hurry the Advertising Section into premature undertakings, then bewail its small return in results.

We should hear at the convention a great deal about heating houses exclusively with gas. In many cases this is already practical, even in severe climates.

We should inquire as to what steps are being taken toward making the gas industry an important producer of motor fuel.

Also about the gas engine and its potentialities.

It will be well to enter into the convention with vision, boundless ambition.

We should aim toward the gas industry we know it will be and keep our undertakings and our plans down to the practical power and financial limits of the gas industry as it is to-day.

Milt H. Saul

As we go to press, word comes in that Milt H. Saul has resigned as editor of our contemporary, the *Gas Record*. We receive these tidings with real regret.

Mr. Saul has proved himself a journalist of high ability. He was a constructive figure in the gas industry, and the fountain-head of many ideas that went to make progress in this field.

Our information tells us nothing of Mr. Saul's plans for the future. We trust that they will be such that his connection with the gas industry will be no less close than it has been.

The AMERICAN GAS ENGINEERING JOURNAL would not like to undertake to set a definite limit to his potentialities, for they may be just as great or as broad as he wills that they be. He has demonstrated conclusively that the ability is there. And it is a thankless task to set oneself down as an authority as to just how far a man thus equipped can go.

Would Permit No One to Sell Industrial Gas Who Is Without Experience in Selling Domestic Business

(*Continued from page* 312.)

structing a new one of 1½-in. pipe in the fire space above the oven, made in a U-shape the entire length of the range. As a rule, the fire-box water coil must be renewed three or four times a year when coal or oil is used as fuel, but the life of a U-back heated by gas is much longer. We have some that have been in use for 18 months and are still in good condition. This one item is quite a saving and should be used in making a comparison with other fuels.

Hotel and Restaurant Business the Gas Man's Own.

In the past six months we changed over 40 of these ranges, giving us an average monthly consumption of over 100,000 cu. ft. of gas each, or a total yearly consumption of over 48,000,000 cu. ft. A little thought will disclose the possibilities of this character of business and how much of it can be procured by going after it energetically. I believe the time has arrived when the gas man can claim the hotel and restaurant business as his own.

Steam boilers for manufacturing purposes are used in vulcanizing, dry-houses, evaporating plants, and many other kinds of business where a small amount of steam is required. There is a tremendous opportunity in this industrial line and an ever increasing source of revenue. There are so many small manufacturers who require steam for whom I do not know of anything so cheap as the gas-fired steam boiler. We can truthfully say that a plant of 5 hp. or under rightfully belongs to gas. Until very recently it was difficult to convince a consumer that gas was a cheaper fuel for the boiler, but at the present time—thanks to the very efficient boilers that are manufactured throughout the country—it has been comparatively easy for the gas salesman to secure this business. There are a great many plants now using a boiler designed for the use of coal and on account of the cost it is sometimes impossible to persuade this class of consumer to displace the old with the new, although it will ultimately be to his advantage to do so, for in the long run the saving effected will pay for the new boiler. Some will not be convinced of this fact, therefore we have been obliged to change many of these old boilers to gas uses; this has been done with a certain degree of satisfaction to the consumer, although we have not been able to develop these boilers to their full power rating. This is due to the fact that these boilers have not sufficient heating surface.

Where atmospheric burners are used the temperature of the gas in the fire-box is much lower than when coal is used; the gas flame temperature being about 1,900 deg. Fahr. and consisting of convexed heat. Where coal is used there is an approximate temperature of 2,500 deg. Fahr. and a radiant heat. In putting the burners in a steam boiler equipped with atmospheric burners the burners must be large enough to consume 75 cu. ft. of gas per horsepower. In making an installation of this kind the following rule should be adhered to: First, see that the boiler is clean—that the flues are clean and the scales are removed from the inside of the boiler. A damper should be on the inside of the smokestack, although some city ordinances will not allow a damper; in such cases I have overcome that obstacle by covering the top of the flues with a plate of 18 or 20 gauge iron perforated to give the desired reduction. The tendency of those using these boilers, on account of the cheapness of the fuel, has been not to pay any attention to heat losses and therefore we should insist on a good grade of covering, and that a control be attached to the gas burner in order to assist in offsetting the difference in the cost of the two fuels.

In the sale of appliances for the treatment of steel used in foundries, etc., there are a great many cities that do not have much of this class of industry.

Stresses Again on Piping.

Piping is one of the most important and most abused parts of the industrial game. A great many installations that should be successful fail on account of improper piping. Very few plumbers or architects have any conception of the amount of gas that may flow through a pipe without a reduction in the pressure. I believe that a certain amount of our work as industrial salesmen should be devoted to education in this respect. To illustrate: A few weeks ago I found a 5-hp. boiler connected up with half-inch pipe. The result was a perfectly disgusted consumer condemning gas and complaining that he could not get up steam. To save this business we had to go to a considerable expense in changing the connections before results could be obtained that were satisfactory. All installations of pipe for industrial uses should be under the direction of the industrial department of the gas company, or by the gas company. A campaign should be started with the appliance concerns to teach them the importance of correct piping.

Special Service to the Large Consumer.

Every industrial department should maintain what I would term an industrial shop. This shop should be fitted up to do all manner of work, such as manufacturing special burners, making installations, designing different appliances for special uses. The shop should consist of lathes, drill presses, emery wheels, tinner's folders and cutters, with small tools to make a complete shop. The man in charge of this shop should be a first-class mechanic who can carry out the ideas and advise with the salesman. Some might suggest that the appliance company be given this industrial work. I cannot see how they can afford to devote the necessary time to make this class of work a success without making the cost of appliances practically prohibitive. I consider industrial appliances no more nor less than agents continually working for the gas company. We go to great expense, first to get a consumer, next to get the appliance properly installed—but what are we doing to keep the business? It is a fact that if these appliances are not kept up as they should be the business gradually goes back whence it came, and every gas company should maintain a maintenance or inspection department, employing men who understand the adjustment of burners, etc., and who would make periodical calls on all consumers burning over a certain quantity of gas. What charge, if any, should be made for this is entirely up to each company and their policy, though personally I believe every large gas consumer is entitled to "Special Service."

Many Homes in New York Now Entirely Heated by Gas

Gas House Heating Should Be Taken On Not as Temporary Makeshift, but Adopted Solely on Its Merits as a Fuel

Frequently a house owner or tenant makes the mistake of considering the heating of his premises by gas, taking into consideration only the present high price of coal and the uncertainty of the coal supply during the immediate months. No greater error could be made. Gas heating is not a makeshift, nor to be so considered, declares a writer in *Gas Logic*. Neither should it be thought of entirely as an auxiliary means of heating.

Gas heating may be used in the latter way in certain circumstances and conditions, but the use of gas for

heating homes, offices, stores and factories should be adopted on its merits as a fuel. The price of coal, and the shortage or abundance of that fuel, is only one element to be considered. There are scores of other reasons to lead you to adopt a fuel that has every advantage over coal and none of its disadvantages.

Has Made Remarkable Strides.

During the last few years gas heating has made remarkable strides in New York City. At one time the popular heater of the cylinder type was very extensively used, and it is still widely used. Then came the heaters of the "reflector" type, more ornate in appearance. In thousands of cases these took the place of other kinds of fuel—coal, wood and oil. The radiator heaters were contemporaneous with those of the "reflector" pattern. These three types of heaters were used with tubing, but later the much more reliable and satisfactory connections by means of a permanent gas pipe attachment were adopted and are now much in vogue.

The development of gas heating has now brought into use the cast-iron gas and gas steam radiators, such as have heretofore been used for steam and hot water heating. In fact, there are now radiators much in use, where both steam and gas may be used. This permits the use of gas where the steam heat has failed, a not infrequent complaint.

Boilers of Development of Recent Years.

It is only within a few years that the gas companies of this city have been installing the most recent and approved type of boilers in the cellars of private homes, by which those entire houses are provided with heat. Old coal burning furnaces and boilers have been discarded in all these cases, and the appearance of the cellars has been greatly improved by the removal of coal and ash piles and the heaps of kindling wood.

These gas boilers have a thermostat attached, which regulates the heat automatically. The device is set to operate at the degree of heat desired, and when that degree is reached, the gas is automatically shut off, and it remains off, until it is again automatically turned on by the thermostat when the temperature falls below the householder's heat requirements. Thus entirely without human thought or attenion, the boiler performs its work.

Property Owners Adopting Gas Exclusively for Heating.

It was during the winter of 1917-1918 that this city was in the throes of zero—and below zero—weather for many days. Coal was not to be had, and thousands of families suffered. The gas companies in Manhattan and the Bronx were called upon suddenly to supply a volume of gas unheard of in the history of gas-making throughout the world. Gas companies all over the country had to discontinue the sale of gas heaters. The scarcity of coal and oil limited the manufacture of gas. Here in Manhattan and the Bronx, the companies replenished their supply of gas heaters, furnished them to those who needed them and delivered a phenomenal amount of gas to use through them. It was found that many buildings, both business and apartment, were not properly equipped with gas pipes. Since then many property owners—having taken the lesson to heart—have installed gas-piping, and have adopted gas exclusively for heating. It does not do to buy gas heating appliances promiscuously. A "low price" often means a *cheap* and unreliable appliance. The heaters we sell are selected and are the very best. They are the convected and radiant types. Convected heat is heat taken up by air passing over heated surfaces; radiant heat is heat thrown off from a hot surface to another surface somewhat cooler than the heat itself, without heating the air between.

In all gas heaters there is a combination of the two forms of heat, and the value of the heater is determined by the amount of radiant heat in excess of the convected heat. Radiant heat acts like the rays of the sun and warms the floor, furniture, occupants of the room or whatever the rays of heat strike. For this reason radiant heat is more valuable than convected heat, as convected heat rises to the top of a room.

When gas is used for heating, the heat is always available. No fire has to be made and watched. No coal need be stored and carried. The instant the gas is lighted that moment you get the desired warmth. Individual rooms may be heated to certain temperatures, unused or unoccupied rooms need not be heated. There is no ash or coal dust to be distributed throughout the house, to soil furnishings and clothing. The air is not contaminated by dust particles containing germs. The gas has a good ventilating effect and consumes the impurities in the air. When a boiler in the cellar furnishes the heat, the gas-fired system possesses every advantage of convenience, comfort and temperature control.

Coal burning appliances deteriorate rapidly. The fire box and combustion chamber crack easily in hot-air systems. This destroys drafts and permits smoke and products of combustion to enter airducts to the rooms being heated. In hot-water and steam systems, there is also faster deterioration than is found in the case of gas-burning boilers.

We always ask those who contemplate changing to, or enlarging, their gas-heating systems, to take advantage of our offer to consult with one of our experts, a service for which we make no charge. A technical survey or study of the premises to be heated should be made. There are many things to be considered. In cold weather, for instance, there is a continued loss of heat from the room to the surrounding colder air. Heat must be furnished to replace the loss. The quantity of that loss per hour depends on many things, such as the construction of the buildings, the temperature to be maintained, ventilation, exposure, outside temperature, etc.

E. N. Hurley Proclaims Superiority of Private Ownership

E. N. Hurley, formerly chairman of the United States Shipping Board, was recently asked what had impressed him most in his governmental position. A portion of his reply is quoted:

"I don't know of a government-owned plant that produces more than two-thirds efficiency. When the manager has no dividend to strive for when the toll is paid, the slowing-up is sure to follow. In the years to come some way may be found to keep incentive to best endeavor in men under government ownership, but until that is discovered that system may be classed as a failure."

English Gas Window Displays Impress Trade Observer as Being Much Behind American Attainment

Overcrowding the Worst Feature—National Indifference to Psycho'-ogy the Probable Cause

By ERNEST A. DENCH

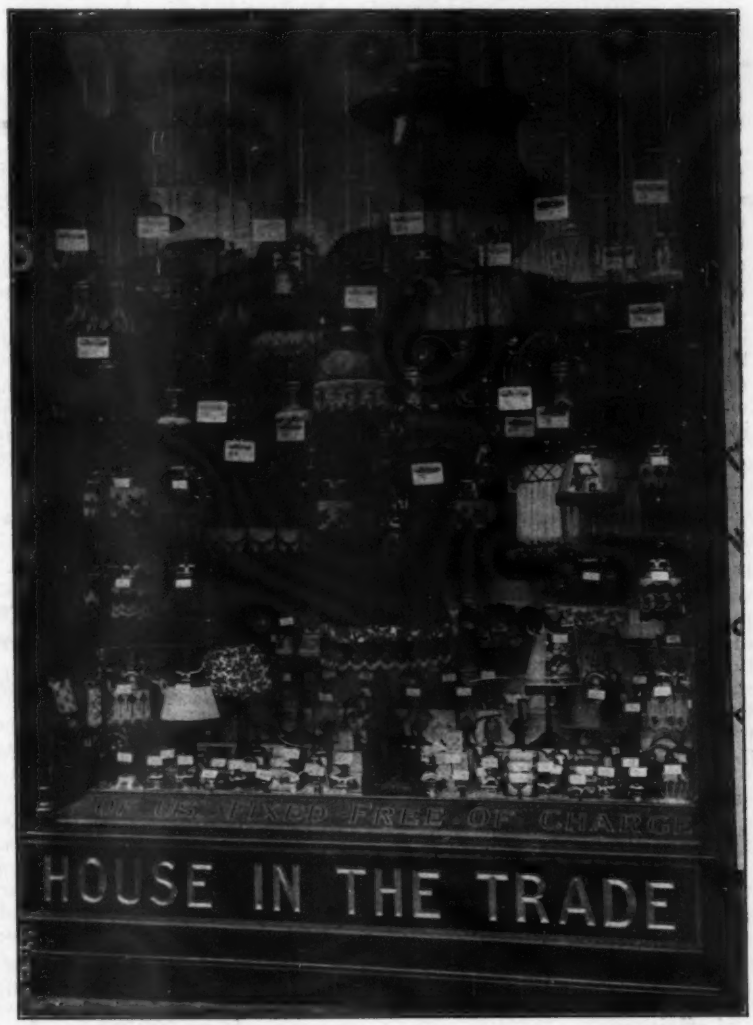
I arrived in Liverpool early in May, proceeded straight to London, and made it my base of operations. It is now mid-August and in those ten weeks I have scouted around practically every shopping district and suburb in London—and, believe me, there are a great many such places—and I have at the same time made a number of tours throughout the southern counties of England, taking in not only the principal towns and seaside resorts but also the small towns and country villages as well. Yet that space of time and amount of effort has yielded only a few gas appliance windows that are worth being set down here. English gas windows are shot from guns.

Judged by the best American standards, most gas windows here are overcrowded, but it is like throwing a red handkerchief at a mad bull to tell the English merchant of this big fault. He may devote a trim to lamps and lamp shades, yet he will introduce practically every kind of lamp and shade carried in stock. The meaning of incentive salesmanship is apparently lost upon him.

The Reason for Overcrowded Trims.

English people care little for psychology, whether it is selling or anything else. They say the most critical things with little or no respent for one's feelings. They make no attempt to analyze one's feelings. Service in the sense that it is known in America is nonexistant here.

The English will never admit that a window is overcrowded. It is always "stocky"—and, believe me, that one word covers a multitude of sins which are committed here in the good name of window trimming. And yet such windows are excused on the grounds that the English love to see and have things in bulk!



A "STOCKY" ENGLISH LIGHTING TRIM, SOUTH METROPOLITAN INCANDESCENT LIGHTING COMPANY, PECKHAM.

AN ENGLISH TABLE LAMP TRIM.

However, the gas companies here do not incline to the same belief; for while their show windows are often devoid of any real selling idea, they are seldom overcrowded. Whatever is in the window is arranged artistically, although numerous kinds of gas appliances may be represented therein. You will seldom see a plush-covered background, and the floor is likely to be of the polished parquet kind without any embellishments. And display furniture, with the exception of potter palms, is conspicuous by its absence.

A Few Lamp Displays.

A window seen in the West End of London was that of Sale, the lighting specialist, Oxford Street, whose trim is reproduced on this page. At the rear were a number of oak shelves in stepladder formation, containing colored lamp shades. In the front center was a tier of glass shelves filled with electric flash-lamps, to which the following card was attached:

HOME OF ELECTRICAL NOVELTIES
AT POPULAR PRICES

Sale's electrical novelties are BEST throughout. Best English made long life batteries. BEST English made cases and osram lamps. A combination insuring the greatest amount of efficiency.

On the floor underneath reposed a number of thermos bottles. At each side were electric candlesticks, while gas and electric chandeliers were suspended from the ceiling.

The South Metropolitan Incandescent Company, Peckham, London, whose window also appears on this page, is of the "stocky" type. Large gas lamps and shades dangled from the ceiling, and also occupied the shelves at either side. The floor was occupied with an extensive selection of gas fittings, a card in the center of which helped to overcome prejudice against new things in the following convincing manner:

All goods purcased of us installed free of charge.

Efficiency Department Proving Economy for Customers

The Oklahoma Gas & Electric Company has established an "Efficiency Department," which is performing a service for the company's customers which is reported to be much appreciated.

In a recent week nine industrial gas installations were inspected and recommendations for improvements or changes made to the owners which are being followed out under the supervision of the department. As a result the efficiency of one installation will be increased 35 per cent; another has cut its gas consumption from 800,000 cu. ft. to 625,000 cu. ft. per day; another will save 40 per cent in its fuel costs; another will save $200 a month.

The department was started in Oklahoma City over a year ago under the management of F. H. Mugg, a gas efficiency engineer. A similar department is now being started for the Muskogee Company by Mr. Mugg. Activities are not alone confined to industrial installations, but every housewife in the city is invited to call upon the department for small adjustments, advice and suggestions. The service is free to all.

An experimental burner for small boilers is now being tested by the department and the creation of a house heating testing appliance is receiving attention.

Big Industrial Field for Manufactured Gas Opens in Ohio District with Dwindling of Natural Supply

The diminishing supply of natural gas in West Virginia, as verified by Government reports, which for some years has been carried through hundreds of miles of pipes underground to Ohio cities, has necessitated restrictions prohibiting industries from its use for factory purposes and now threatens higher rates for domestic consumers.

The problem of Cleveland is similar to that of Pittsburgh and the southeastern Pennsylvania territory. A similar problem has been presented in the Kansas cities and the Kansas and Missouri territory served with natural gas piped from Oklahoma and Kansas fields.

The conservation of this supply for domestic use is advocated. This means barring industries from using natural gas. Many of the large manufacturers are placing gas-producing plants in operation to manufacture gas for factory purposes.

The natural gas problem also extends to the manufactured gas-producing and electric light companies of this and other States, with the higher price of coal, labor and materials. These utility problems, gas and electric company officials say, can be likened to the problem of the electric railway systems, which have been operating under fixed rates not based on cost of production.

Many communities of northern Ohio are served by the East Ohio Gas Company. This company is allied through officers and stockholders with the Standard Oil Company. President M. B. Daly has placed the natural gas situation before these

communities. Rate changes have been asked in franchises which yet have years to run, and where franchises come up for renewal higher rates are asked.

It is proposed to the communities that by charging higher rates the use of natural gas by factories will automatically be curtailed. Kansas City has recognized this and now has a rate as high as 80 cents for each 1,000 cu. ft. Canton, O., also set new rates in a franchise.

Cleveland, which for years had a rate of thirty cents, some time ago granted an increase to 35 per unit of measurement. It is now proposed to increase this.

To conserve the natural gas supply, the Legislature of West Virginia at its last session passed a law restricting the amount of gas that could be taken from the State. Pennsylvania and Ohio contested this action by taking it to the higher courts.

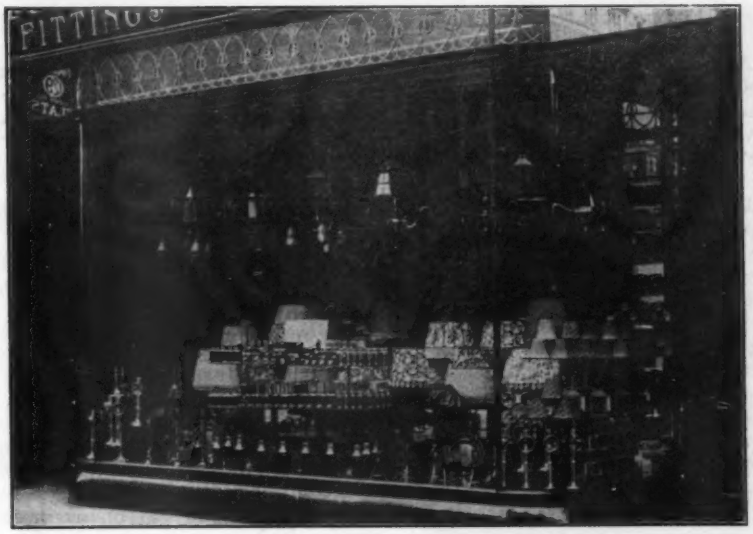
The plight of Cleveland is the same as that of Akron, where the East Ohio Gas Company is preparing old manufactured gas plants and building new ones to supply manufactured gas this winter at a rate of $1.35 to $1.40 a 1,000 ft. Youngstown, another industrial center in which rates affect great numbers of consumers is asked to sanction higher natural gas rates.

Salem, in the center of a natural gas producing field in Ohio, was asked a 55-cent rate by the company supplying the city. Alliance, on the main pipe line service from West Virginia to Cleveland, was threatened with the shutting off of the supply if a franchise rate adjustment is not made. The right to shut off service is being considered by the Ohio public utilities commission and State officials.

Similar conditions affect Kane, Pa., and other northwestern Pennsylvania cities, where the Pennsylvania Gas Company and allied natural gas companies are opposed in the matter of higher rates.

The East Ohio Gas Company is paying 7 per cent annually in dividends on $10,000,000 preferred stock, and dividends on the $30,000,000 common stock outstanding in recent years have been on the basis of 10 per cent annually.

The Sandusky Gas & Electric Company, of Sandusky, Ohio, reports that the record of the gas department shows that during the month of September there was a net gain of 16 gas customers.



A GOOD EXAMPLE OF A LONDON LIGHTING WINDOW.

A Gas Appliance a Detriment to the Company Unless It Is Performing Its Work Thoroughly

C. W. Johnson Discusses the Sales Organization and Its Work—Determining the Best Method of Compensation by Actual Test

The successful development of any industry, including gas and electric utilities, depends very largely on the efficiency of its sales or commercial organization. Gas manufactured and energy generated in a power plant is of small value unless profitably sold, C. W. Johnson reminded gas men in a paper at the recent annual convention of the Michigan Gas Association. Like many other classes of business, it is necessary to create a demand for the products of the utility company, and the more efficient the sales organization, the better results obtained.

General Commercial Department

The following outline covers the sales organization in a group of combined gas and electric companies operating in towns of approximately 50,000 population. In such combination companies two divisions are made in the sales organization:

(1) Gas department.
(2) Electric department.

These departments are each divided into three sub-divisions as follows:

(1) Gas department: (a) Industrial, hotel and restaurant division; (b) Domestic division; (c) Merchandizing division.

(2) Electric department: (a) Power division; (b) Lighting Division; (c) Merchandizing division.

Central Organization.

In order to co-ordinate the efforts and activity of the sales department a central organization is maintained. This central organization is arranged as follows:

(a) General sales manager.
(b) Power engineer.
(c) Lighting engineer.
(d) Industrial engineer.
(e) Merchandizing department.

It is the duty of the man in charge of each department to become thoroughly familiar with the branch of work under his supervision at each local company that he may further develop more efficient methods of securing additional business. This central organization acts largely in an advisory capacity. Special investigations for analyzing operating costs of isolated plants and devising methods whereby gas can be used as a fuel are made by the central organization upon request from the local companies.

Local Organization.

As stated above, each local organization is divided in the same manner as the central organization, having a sales manager along with the above sub-divisions that specialize in the various fields of work. Taking a combined company with a population of 90,000, as an example, we have the following local sales organization:

The sales manager has general supervision of gas and electric sales, line and main extensions, together with the sales of merchandise. He also has full responsibility over all relations with the customer aside from matters of accounting.

The power engineer, as the term would imply, assists in the application of electric service to the customer's manufacturing operation. Tests for determining power requirements, if electric service is to be used, are made by the power engineer with the assistance of men from the meter department. A report, comparing operating costs, is prepared and submitted to the prospective customer by him.

The duties of the industrial gas engineer parallel for the gas department those outlined for the power engineer in the electric. This work comprises all manufacturing and mercantile establishments in which heat is applied to the materials used in the manufacture and preparation of the completed product. The industrial gas engineer also has charge of the hotel and restaurant work, which includes all establishments (not including residences) in which heat is applied to food products in the preparation of meals.

In order that we may further increase the commercial lighting load, one man has been assigned to this division of the work. Our revenue in many instances can be materially increased without any additional investment by finding means whereby the customer can profitably use our service over a longer period in the day. A better load factor generally means more profitable business. Our lighting engineer assists the prospective customer or his architect in planning proper illumination for his residence, factory or store. The sale and installation of electric signals and display advertising, together with improved window and store lighting, also come under his supervision.

Associated with the lighting engineer we have district representatives. For instance, Flint has been divided into five districts and one man placed in charge of each. Each district representative is held responsible for the development of the company's business in his respective district. A house to house canvass is made for the purpose of coming into contact with the customer. Any special complaint regarding service is taken care of by these men. They also make record of appliances, both gas and electric, that are used and report to the office any customers who are particularly interested in some special class of merchandise. The houses along our existing lines, that are not served with either gas or electricity, are also recorded and the owners solicited. This enables us to obtain a large number of new customers where our present investment for distribution lines and gas mains have previously been made.

Service.

Without question the most important work the sales department can perform is that of rendering efficient service to the customer. An electric or gas appliance is a detriment to the company unless it is performing its work thoroughly. It is our desire that the customer immediately advise the sales department of any difficulty relating to our service. This service work should be made self-sustaining. We aim to charge for such work unless it comes within a specified guarantee period, when free replacement is provided. The merchandizing department can and should be placed on a profitable basis. It must be conducted as any other mercantile business, if it is to succeed and produce an adequate return on the investment required for material stocks and accounts receivable.

Since the sales organization is the bond between the customer and the company, the more effective its work of selling SERVICE, the more satisfactory will be the results obtained. SERVICE does not necessarily mean the sale of gas or electricity, but useful advice as to the most efficient means of using the company's product.

This policy has been tested out and has proven a success. One particular instance in mind is that of Kalamazoo, where, during the month of August, a service canvass was made of the industrial gas field during which time the following smaller class of industrial equipment was sold with a total estimated annual consumption of 2,097,000 cu. ft.:

	Consumption per 1,000 cu. ft.
1—43 Vulcan Burner (Convert Chilli Stove)	10,000
1—943 Vulcan Burner—Converting glue pot	60,000
2—No. 1 Johnson Soldering Furnaces	45,000
2—No. 83 Brazing Burners	30,000
1—Bakers Fryer	90,000
1—Vulcanizing Plant	60,000
2—2-in. Torch Burners (Converting Core Oven)	100,000
2—2½-in. Torch Burners (Converting Core Oven)	960,000
1—Waxing Machine Converted	12,000
2—101 Johnson Soldering Furnaces	100,000
1—82 Improved Brazing Burners	60,000
1—83 Improved Brazing Burners	60,000
1—410 "A" Improved Soft Metal Furnace	20,000
1—No. 8-A Humphrey Automatic Water Heater (With Booster)	300,000
1—420 F. Soft Metal Furnace	40,000
1—No. 943 Vulcan Burner Steam Table	12,000
2—Special Swedge Heaters	54,000
1—Restaurant Range	48,000
2—Tailor Irons	36,000
Total	2,097,000

Merchandizing Department.

The same specialization that we carry through for the power department, illuminating work and industrial gas sales also holds true with the merchandizing department. We have found it advisable to place the responsibility of selling washing machines on one or more men as the conditions warrant. It is bread and butter for such washing machine salesmen to see that each customer who can afford to purchase and use an electric washing machine has been

(*Continued on page* 334.)

The Department of the Interior, Bureau of Mines, Washington, D. C., Opens New Million Dollar Laboratories at Pittsburgh, Pa.

Elaborate Program for Dedication Carried—Many Prominent Men in the Field Took Part

Mechanical engineers and other men interested in the problem of obtaining greater efficiency in the burning of coal, especially since the increase in the price of coal has made the problem even more urgent than ever before, attended the dedication of the new million-dollar laboratories of the Bureau of Mines, Department of Interior, in Pittsburgh, Pa., Sept. 29, 30 and Oct. 1.

The fuel investigations of the Bureau of Mines constitute a large and important part of the work of the bureau, and ample recognition of this was noted in the arrangements of the new laboratories and their equipment for the highest grade of research and routine work. It is here that typical coals, gathered from all parts of the country, are analyzed and tabulated in such a manner as to give to the public general information of the coal fields of the country. It is also here that the actual experiments in the combustion of coal take place under experts and their findings given publication.

THE NEW MILLION DOLLAR LABORATORIES OF THE U. S. BUREAU OF MINES AT PITTSBURGH, PA.

So far has this work advanced, the National Fuel Administration, organized during the war to urge the greatest conservation of fuel as a means of helping to win the war, builded on the work of the Bureau of Mines and distributed to the public a large number of the publications of the bureau, and also called upon the bureau in an advisory capacity in many cases.

The Bureau of Mines has been the pioneer in the combustion experiments in the United States, and has already issued a number of reports that are well known to engineers and firemen. Many prominent engineers and men familiar with combustion experiments attended the dedication, showing their interest in Government research in this fundamental field.

The dedication ceremonies as expected brought to Pittsburgh for the three days the most prominent mechanical engineers and mining and metallurgical men of the nation.

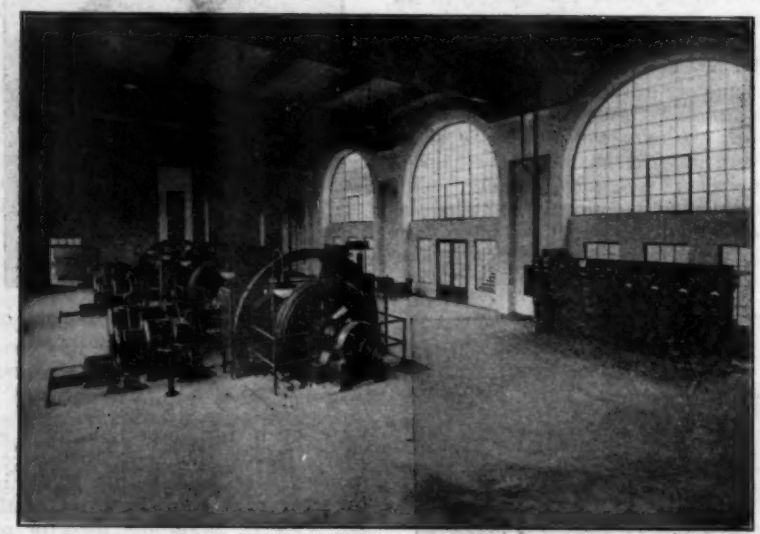
The Bureau of Mines, in co-operation with the Pittsburgh Chamber of Commerce, arranged a complete and elaborate program of events which included the presence of high Government and State government officials, besides the leading men of scientific and mining thought in the country. The ceremonies proper opened on Monday morning, Sept. 29. The evening before Sunday, Sept. 28, there were reception committees at the various leading hotels to receive the guests. On Monday morning the new laboratories in the city of Pittsburgh, at 4800 Forbes Street,

DR. VAN H. MANNING, DIRECTOR OF THE UNITED STATES BUREAU OF MINES.

were open for inspection, and at 10.30 o'clock the dedicatory ceremonies were held on the lawn in the rear of the laboratories, with Dr. Van H. Manning, director of the bureau, presiding. After invocation by Dr. S. B. McCormick, chancellor of the University of Pittsburgh, there was given the address of welcome by the Hon. E. V. Babcock, Mayor of Pittsburgh. Response was made by the Hon. Franklin K. Lane, Secretary of the Interior, and then followed addresses by Horace B. Winchell, president of the American Institute of Mining and Electrical Engineers; John L. Lewis, acting president of the United Mine Workers of America, and the Hon. William C. Sproul, Governor of Pennsylvania. The formal ceremony of handing over the keys of the building by Secretary Lane to Director Manning followed.

After luncheon at the Bureau of Mines buildings the guests all boarded special trains on the B. & O. Railroad to the experimental mine of the Bureau of Mines at Bruceton, Pa., fourteen miles from Pittsburgh. Upon arrival there a prearranged explosion of coal dust took place in the experimental mine as a demonstration to the visitors, and after that there was an inspection of the mine and the explosives

testing plant. The guests returned to the city at 6 o'clock in the evening. At 8 o'clock a general meeting was held at Carnegie Music Hall under the auspices of the Pittsburgh Chamber of Commerce, with an address by Secretary Lane, an organ recital by Dr. Charles Heinroth, and a moving picture prepared by the National Coal Association, "The Story of Coal," which was its first presentation.



A GLIMPSE OF THE ENGINE ROOM SUPPLYING POWER FOR THE LABORATORIES AND WORKSHOPS OF THE BUREAU OF MINES STATION

On Tuesday, Sept. 30. the new laboratories were opened for inspection by the guests the entire day, and at 2 o'clock the elimination contests in the National Safety First Aid and Mine Rescue Meet were held at Forbes Field, also the awarding of the State championships. At 5 o'clock, at Forbes Feld, there was a demonstration of the explosibility of coal dust, and at 8 o'clock the Chamber of Commerce presented a pageant typifying the spirit of the mining industry, with music by the band of the Carnegie Institute of Tchnology.

On Wednesday, Oct. 1, at 9 a. m., there was a final mine-rescue contest by the ten successful teams of the previous day at Forbes Field, with a presentation of the national cups and prizes. At 2 o'clock in the afternoon announcement of the J. A. Holmes Safety Association was made by Dr. Van H. Manning. At 2 30 o'clock the final first-aid contest participated in by the twenty best teams of the previous day for the gold cups and prizes was held. At 5 o'clock there was a demonstration of coal-dust explosion at Forbes Field, the events closing with a smoker at the Chamber of Commerce in which the prizes were awarded and speeches were made.

The honorary committee in charge of the dedication of the Pittsburgh station comprised a notable list of men high up in the technical field. John F. Herron, president City Council of Pittsburgh; Harry N. Taylor, president National Coal Operators' Association; John L. Lewis, acting president United Mine Workers of America; Horace B. Winchell, president American Institute of Mining and Electrical Engineers; Hon. Franklin K. Lane, Secretary of the Interior; Dr. Van H. Manning, director Bureau of Mines; Dr. S. B. McCormick, chancellor of the University of Pittsburgh; Dr. Arthur A. Hammerschlag, president of the Carnegie Institute of Technology; Dr. S. W. Stratton, director Bureau of Standards: Dr. R. F. Bacon, director Mellon Institute; Seward E. Button, chief Department of Mines, State of Pennsylvania; Dr. D. Van Schaack, president of the National Safety Council; T. A. O'Donnel, president American Petroleum Institute; Mortimer E. Cooley, president American Society of Mechanical Engineers; Fayette S. Curtis, president American Society of Civil Engineers; J. A. Capp, president American Society oi Testing Materials; Dr. William H. Nichols, president American Chemical Society; Calvert Townley, president American Society Electrical Engineers; G. H. Neilson, president Engineers' Society of Western Pennsylvania; Dr. W. D. Bancroft, president American Electrochemical Society; R. T. Stull, president American Ceramics Society; E. N. Zern, president Coal Mining Institute of America; James R. Angell, chairman National Research Council.

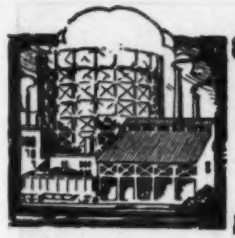
A Gas Appliance a Detriment to the Company Unless it is Performing Its Work Thoroughly

(*Continued from page* 331.)

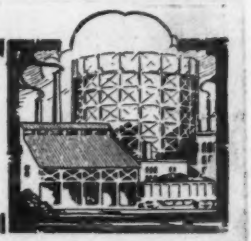
given the opportunity to have this this appliance demonstrated in their own home. The same maintains with the sale of vacuum cleaners, automatic water heaters and other appliances requiring special sales effort.

This year we are employing several methods of compensation in order to determine which can be used to best advantage. We now have men on a straight salary basis and this has been found especially desirable for power, industrial gas and lighting engineers. In several companies the sales managers are working on a salary together with a bonus that is based on the net merchandizing results. Washing machine, vacuum cleaner, and automatic water heater specialists are paid a salary plus a commission on each machine sold by the company at retail. In some instances we have salesmen who are working on a straight commission basis with a drawing account. However, this has seemed less desirable in the majority of cases to both the salesman and the company.

In theory the purpose of the sales organization, about which this outline is given, is to more fully serve the customer. As with all other work, success is largely dependent upon the personnel and integrity of the organization. We must convince ourselves first, then the organization as a whole, that SERVICE is the keynote to success, and if this is done, there is no question but the sales or commercial organization in the public utility business will be just as large a factor towards its success as with the company manufacturing and distributing automobiles or any other product.



NEWS OF THE GAS INDUSTRY



Field of Lighting Highways Comparatively Undeveloped

In discussing the field for improvement in municipal street lighting one of the manufacturing companies of lighting supplies makes the suggestion in its house publication that an opening for business in outdoor lighting, as yet comparatively undeveloped, is presented by the highways.

"With the steady increasing amount of motor-truck transportation," says the paper, "the field should develop into a very important one."

Raise Granted Shawnee Co.

Announcement was made that the Shawnee Gas and Electric Company, of Shawnee, Okla., would raise its gas rates from 31½ cents to 44 cents, net 40 cents, retroactive to Sept. 1. The raise is granted to the company by the State Corporation Commission on account of the extra expense of the company in connecting its pipes with the Walters field. Formerly the pipe line extended only to the Cement field and the gas flow was

Company Sells Its Plant to New Firm for $65,000

Negotiations have been completed whereby the gas plant of the Consolidated Gas Company at Newcomerstown, Ohio, was purchased by the Newcomerstown Gas Company, a recently incorporated firm. It is understood that the purchase price of the gas plant was in the neighborhood of $65,000.

The deal comprises the purchase of seven gas wells. all located in the vicinity of Newcomerstown, and the residents of the latter town are furnished with gas by the plant. The new company will take over the property in about two weeks.

The stockholders and directors of the Newcomerstown Gas Company are as follows: John S. Archer, Charles H. Vaughn, O. O. Kinsey, W. J. Cook, T. B. Nott and Clyde Archer.

Better Industrial and Store Lighting Campaign Strongly Urged

In several towns in the territory of the Public Service Company of Northern Illinois "better store lighting" campaigns have been conducted in the past few months with excellent results. Storekeepers and owners of establishments having large interiors in which industry is carried on have been found readily responsive to the advantages of skilfully planned artificial lighting arrangements. It is likely that considerable time will be devoted this winter to the subject, which is made interesting by many improvements completed in lighting practice and in the essential equipment for it by the laboratory and research departments of the large manufacturing concerns.

The great industrial districts constitute a field for flood lighting. The benefits of this method of illumination received many strong demonstrations during the war. Flood lighting inaugurated as a means of lighting the grounds and the exterior of buildings in large plants is applicable also to interiors. In an article in a recent electrical trade paper a writer describes a saving made of 20 per cent on labor in the maintenance department of a machine tool factory through the use of a portable flood light.

Dennison and Uhrichsville, Ohio, Face Gas Shortage

The cities of Dennison and Uhrichsville, Ohio, face a gas shortage during the middle of the coming winter, when franchises of the East Ohio Gas Company expire.

The gas company representatives said the supply might then be cut off with no offer of new contracts from the company.

The franchise of Dennison expires on Dec. 17, and Urichsville's contract expires Jan. 1.

A Chance for Gas Lighting Publicity

The Ohio State University, recognizing the practical importance of lighting in industry, has established a course of twelve lessons on industrial lighting practice. In this course the essential fundamental principles are taught in a clear and practical manner. The best established practice is described, partly through the medium of trade literature and technical bulletins of the lighting equipment manufacturers. The application is illustrated through practical problems in such a way as to give the student a definite conception of the best methods of treating lighting problems.

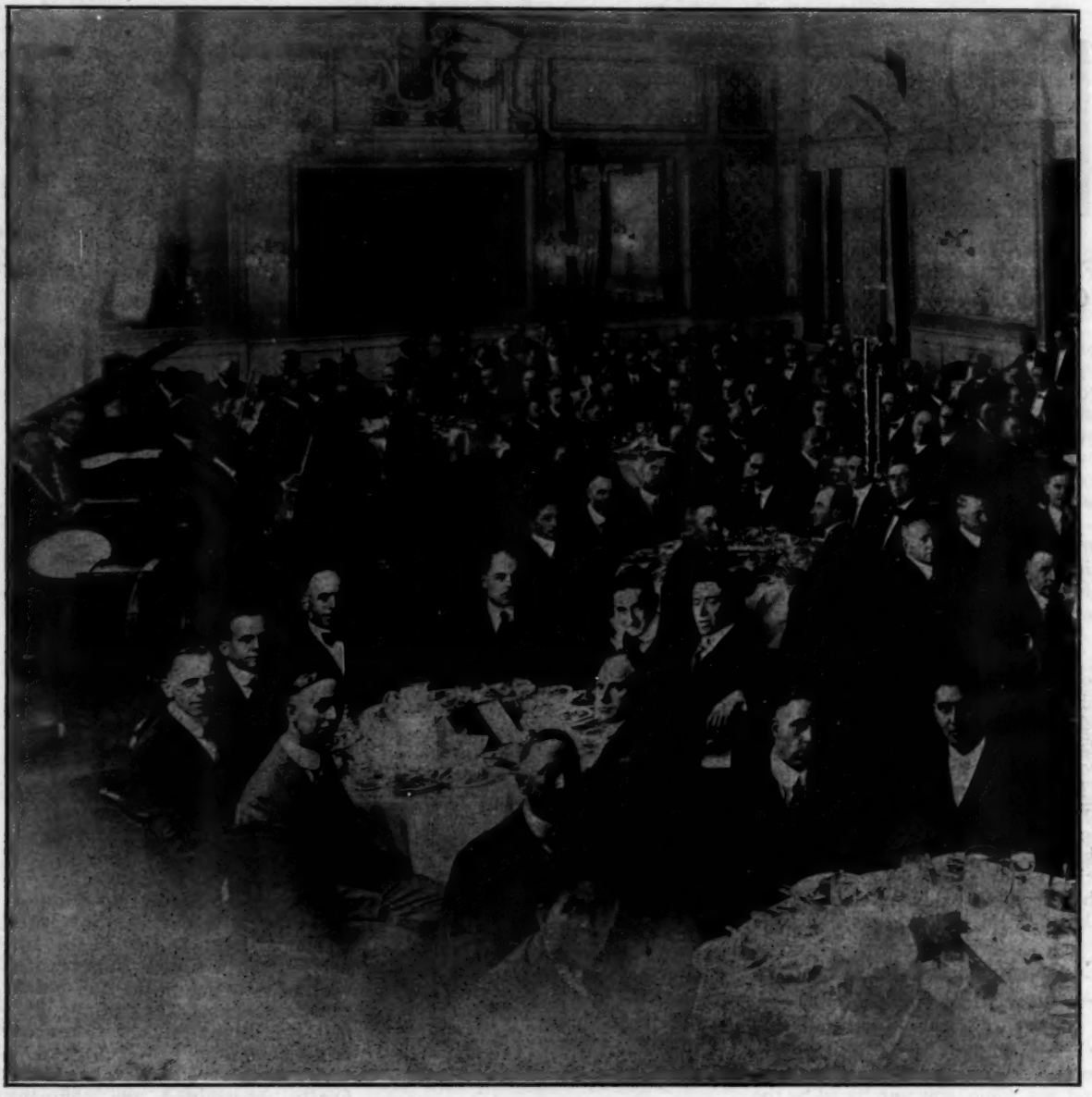
Many Cities Watching Proceedings in Chicago to Determine Valuation of Property

What is regarded by the gas industry as one of the most important cases in recent months opened in Chicago Oct. 1 before the Illinois Public Utilities Commission, which is to determine the valuation of the properties of the Peoples Gas Light & Coke Company, of Chicago.

After the valuation has been finally determined, the company will seek to have rates based on the cost of service and thus provide a fair return to the investors on the amount of capital invested, counsel for the company stated.

The former rate was 70 cents, but an emergency rate of approximately 88 cents was allowed. Then, after a lengthy hearing last summer, the commission ordered a reduction of 3 cents, making the present rate approximately 85 cents.

It is declared that a number of other cities are closely watching the progress of the case, and that they will be guided somewhat by the results obtained.



The Twenty-Sixth Annual Convention of the

To expedite the hearing, which is expected to continue over a period of several weeks, it was agreed that a recess until Oct. 21 would be taken by the commission, and in the interim counsel for the company, for the city of Chicago and representatives of the commission will hold daily conferences to go over the huge mass of evidence and determine what part of this may be submitted in the case without objection on the part of the city's legal representatives.

Before this recess was decided upon, however, the company attorneys submitted in evidence fifty-seven volumes of records prepared by the offices of five of the leading engineering firms of Chicago, who were engaged by the company to carry on an inventory which started in December, 1915. The reports prepared by these concerns were as of Jan. 1, 1917.

William A. Baer, head of one of the engineering firms, testified as to the methods used in preparing the inventory, and said that the only instructions received from the company officials were that that the figures be as accurate as it was humanly possible to make them. He said that while three firms did the actual work of appraisement, two firms followed up and did only a checking of the figures as prepared and submitted by the three firms. He testified that a measurement of seventeen miles of the company mains resulted in figures which were almost identical with those previously prepared for publication by the company employees.

Counsel for the city, Donald R. Richberg, asked the commission whether permission would be al-

Pacific Coast Gas Association, Held in Los Angeles, Sept. 16 to 19

lowed later on for the filing of a petition by the city in answer to the petition of the company for the hearing. He was informed that while the gas company had not made a petition for a change in rates, and that the only point for consideration now is the valuation of properties, the city would be permitted to file any paper desired.

In reply to a question by the commission, counsel for the company stated that it would be practically impossible to submit figures showing the original cost of the company properties, and that under rulings of the Supreme Court it was unnecessary from a legal standpoint. Company attorneys contended that the present valuation was all needed for the commission to legally determine what fair return should be allowed.

Mr. Richberg in reply said the city was prepared to present the original cost figures of the gas company properties and also the cost of reproducing equipment and the investment history of the company. He said the city would also present an analysis and criticism of the company methods.

While the daily conferences will be of a somewhat formal and official character, the commission pointed out that none of the stipulations or agreements entered into by opposing counsel in the case would be binding upon the commission.

The commission is being represented at the daily conferences by Matthew Mills, assistant attorney-general of Illinois, and A. S. B. Little, the commission's gas expert.

Rapid progress is expected to be made at the conferences in the way

of disposing of evidence not relevant to the present case, and thus reduce the time which would be consumed before the commission.

After protracted discussion it was decided that evidence taken at the hearing last summer could be introduced at the present hearing on motion by counsel of either side. It was stipulated, however, that in event such evidence is brought up either side can call the witness who testified and can re-examine him at liberty.

Roasting a Ton of Coffee a Day

A large gas installation in the western district of Chicago will permit of the roasting of a ton of coffee a day. While the use of gas for this purpose is far from new, the scope of the operations in this concern is a testimony to its efficiency.

New Jersey State Gas Association Summer Meeting

The summer meeting of the New Jersey State Gas Association was held at the Ocean City Yacht Club, Ocean City, N. J., on Sept. 8 last. There were about sixty members and guests present. The party motored to the beach for an hour's bathing, which was followed by a chicken dinner at the yacht club. Col. Oscar H. Fogg, secretary-manager of the American Gas Association, was the chief speaker of the occasion. Louis Stotz, W. Griffin Gribbel, W. W. Barnes and A. B. Valentine enlivened the meeting with humorous speeches and anecdotes. Mr. Barnes also sang his favorite solo. R. P. Crawford, of Philadelphia, and James Austin, of Ocean City, were elected members of the association. Following the dinner the members enjoyed a yacht trip down the coast. At 5 o'clock the Millville gas men defeated the Bridgeton team in a game of baseball by the score of 13 to 5.

NATIONAL SAFETY COUNCIL through the Chamber of Commerce of St. Louis for plant superintendents and foremen, will open in October another school. This school will be in charge of J. C. Josse, general superintendent of the Continental Portland Cement Company. His course will include Education of the Workman, Handling of Men, Foremen's Duties in Industrial Safety and other subjects.

Peoples Company Designs Gas Furnace for Vitrifying and Glazing Spark Plug Insulators for the Ring Spark Plug Company

A furnace has been designed by the engineers of the Peoples Gas Light & Coke Company, of Chicago, for vitrifying and glazing spark-plug insulators, to be used by the Ring Spark Plug Company. The furnace is of the circular beehive type, with a semi-muffle-down draft, and will be 8 ft. in diameter and 12 ft. in height.

The company is constructing its own furnace, which will be made of firebrick and sil-o-cel, and the gas company will furnish the burner equipment, consisting of six No. 1 Zander blast burners.

In the operation of the furnace the material will be placed in the heating chamber and brought to the required temperature very slowly, the whole heating operation extending over a period of forty-eight hours. Experiments were carried on in the laboratory of the Peoples company, at 1229 South State Street, Chicago, to determine the temperature and the time required to complete the operations successfully.

Campaign for Higher Salaries for Engineers in Public Service

The campaign for higher salaries for engineers in the public service in New York City is progressing, according to the announcement of Secretary C. E. Drayer of the American Association of Engineers. The public service committee of the New York chapter of the association has presented a report to the city with recommendations for increases. The chief suggestions are for a graded increase of salaries to be paid all technical employees, ranging from 73 per cent for the lowest paid to 20 per cent for those receiving more than $5,000 per annum, the increase for the city amounting to $1,446,000, including the commissions, and an alternate proposition for a flat increase of approximately $500 as an absolute minimum increase which should be granted if the first plan is rejected.

Increased Rotary Ovens One Effect of Prohibition

The Public Service Company of Northern Illinois calls attention to the influence of prohibition upon the number of shops using rotary ovens for the baking of cakes, cookies and bread. In the Chicago district many former saloons are now operating as bakeshops, and the use of the rotary oven has proved universally popular. A great number of gas installations has resulted from this movement.

Rate Increase Petitioned in Beatrice, Nebr.

The Nebraska Gas and Electric Company of Beatrice, Nebr., has asked the city commissioners to grant it a 20 per cent increase in rates. The company has for some time been operating from three to seven cents less than the rate permitted by the city ordinance. The rates asked would increase residence rates from 9 to 10.08 cents and commercial rates from 5 and 6 cents to 6 and 7.02 cents.

Charles M. Schwab Spoke at Banquet of Fifth National Exposition of Chemical Industries

Consolidation of the chemical priority gained by America during the war, and extension of the chemical sciences into new fields, was the keynote of the Fifth National Exposition of the Chemical Industries in Chicago, Sept. 22 to 27. In many ways this year's exposition was the most successful of the series, and to Chicago the novelty of entertaining the giant show was stimulating. The meetings of the four great technical societies held in connection with the exposition proper did much to elaborate the discoveries and principles brought out by the hundreds of exhibits.

Of special interest to members of the gas industry were many of the sessions of the American Institute of Mining and Metallurgical Engineers, held at the Congress Hotel. It was the practice of the institute to divide into groups of a hundred or so for technical sessions, which took the form of discussion of papers submitted by members, previously printed and distributed. A vast amount of specialized and expert knowledge was thus brought to bear

upon current problems of mining and metallurgy.

Sessions of the institute Monday morning and afternoon, Sept. 22, on coal and gas, brought out many important phases of the developing science. Carl Scholz presided at both meetings. The following papers were discussed:

"Research in the Coal Mining Industry," by E. A. Holbrook.

"Some Factors that Affect the Washability of a Coal," by Thomas Fraser and H. F. Yancy.

"A Use Classification of Coal," by George H. Ashley.

"Distribution of Anthracite," by A. S. Learoyd.

"Height of the Gas Cap in the Safety Lamp," by C. M. Young.

"Engineering Features of Modern Large Coal Mines in Illinois and Indiana," by C. A. Herbert and C. M. Young.

"Gas-producer Practice," by G. S. Brooks and C. C. Nitchie.

"Testing of Coals for By-product Coking and Gas Manufacture," by Horace C. Porter.

"Coals of Ohio and Their Limitations for By-product Coke," by Wilbur Stout.

"Outdoor Substations in Connection with Coal-Mining Installations," by H. W. Young.

On Wednesday there was a symposium on sulphur in coal, presided over by Professor H. H. Stoek, at which the following papers were presented:

"Removal of Sulphur from Illuminating Gas," by W. W. Odell and W. A. Dunkley.

"Low Sulphur in Coal," by H. M. and T. M. Chance.

"Low Sulphur Coals of Kentucky," by Willard R. Jillson.

"Low Sulphur Coal in Illinois," by Gilbert H. Cady.

"Sulphur in the Coking Process," by S. W. Parr.

"Commercial Recovery of Pyrite from Coal," by S. H. Davis.

"Sulphur in Producer Gas," by F. Crabtree and A. R. Powell.

The annual banquet of the society, held in the gold room of the Congress Hotel, Thursday evening, was the occasion for speeches by Charles M. Schwab, of the Bethlehem Steel Corporation, and other noted figures in the mining and metallurgical world.

The other societies meeting in connection with the exposition, the American Electrochemical Society, the American Ceramic Society, and the Technical Association of the Paper and Pulp Industry, held meetings full of interest to the engineer and the chemist. Several distinguished scientists from France and England were present to add their old-world knowledge to the eager scientific spirit of America.

Gas Industry Watching with Interest Plan for Association of Employers of the United States

Representatives of the gas engineering industry are watching with interest a movement which was launched recently at a meeting in the offices of the Illinois Manufacturers' Association in Chicago, which has as its chief object greater unity among employers in meeting conditions set forth by labor unions and radical leaders.

Under the plan set forth by speakers at the meeting, which was attended by representatives of a dozen or more associations of various industries, the employers of the United States are going to band together in one big union or association for mutual protection.

A committee of five was appointed to confer with the representatives of employers' associations in the United States and interest them in the project.

"You can call it a union or anything you want to," said John M. Glenn, secretary of the Illinois Manufacturers' Association. "The committee on organization of five members was appointed to bring together all organizations in the United States who will stand for law and order, and to move against all actions by labor unions and radicals."

Personal Notes

Milt Saul Resigns from Gas Record

Milt H. Saul, editor of the *Gas Record*, Chicago, has resigned from that publication. Mr. Saul's resignation takes effect Nov. 1.

COLONEL DAVID W. LOW, who for over twenty years was corporation clerk and treasurer of the Gloucester (Mass.) Gas Light Company, died at his home in West Gloucester, Mass., on Sunday afternoon, Oct. 5. Colonel Low was one of the foremost citizens of Gloucester, Mass. He took a prominent part in the affairs of the city until about 15 years ago, when he retired from active life.

Donald McDonald on Americanism

Donald McDonald, vice-president and general manager of the Louisville Gas & Electric Company, in dedicating the company's new community house for the employees of its coal mine at Echols, Ky., preached an effective sermon on Americanism. After describing the importance of the work of the miners in providing coal to generate the electricity used in Louisville he pointed out the blessings resulting from the foundation and perpetuation of the Republic. In the course of his talk he said:

"I often think that the American people have been like children raised in a comfortable home. They think that food and clothes and warmth come as a matter of course, and they forget the constant effort of the father and the mother who provided these things. Our people have felt that freedom and safety and order are matters of course, and they have hardly realized that it is our great Government that has provided and preserved these things for them."

A. G. SCHROEDER, of the Grand Rapids Gas Light Company, was reelected secretary and treasurer of the Michigan Gas Association at the meeting in Detroit yesterday. E. C. Campbell, of Benton Harbor, is president, and John Ballin, of Detroit, vice-president.

SUPT. CARLETON WARREN, for two years in charge of the plant of Worcester (Mass.) Gas Light Company, has been obliged to take a rest on account of the condition of his health due to overwork, as a result of the gas strike.

ALBERT BROWN, assistant superintendent, is acting as superintendent.

JOHN ERICSON, city engineer of Chicago, and for more than 35 years an employee of the city, has resigned his position to become consulting engineer for the department of public works. P. S. Coombs, at present assistant city engineer, will take Mr. Ericson's place for the present at least.

R. E. Morrison, manager of the Kansas City office of the Empire Companies, has resigned to become assistant to the president of the Alfred J. Deischer organization.

Mr. Morrison was the first representative of the Empire Companies in Kansas City, opening the office in January, 1917. He later organized an advertising department for the Empire organization, the chief feature of which was a wide-spread advertising campaign for the gas division, which has been in operation ever since that time. The unique feature of this campaign has been that the advertisements, carried in about 50 different publications in Kansas, Oklahoma and Missouri, are changed daily. The idea since has been taken up by other gas organizations over the country. Mr. Morrison was the originator of the idea of an employees' newspaper for the Empire Companies, and *The Empire* was planned and initiated under his direction.

Construction Notes

Hyde Battery Company Installing Gas Furnace for Oxidizing Copper

The Hyde Battery Company, of Chicago, has designed and is building a furnace for the oxidizing of copper, particularly the scrap metal. The furnace, which is of the full muffle type, has a muffle 30 in. wide, 12 in. high and 6 ft. long, and will be of firebrick throughout. The scrap copper is to be put in the muffle of the furnace and heated to the required temperature, when air is admitted to complete the oxidation. It is expected that if this type of furnace proves successful a number of additional ones will be built.

Gas Furnace with Novel Features Under Construction in Paint Factory

A gas furnace containing novel features is being constructed for the Elastic Paint Company, of Chicago, upon a design made by the Peoples Gas Light & Coke Company. The furnace will be used for heating a special material to be used in the manufacture of elastic paint, and is of the automatic heating type, gravity fed. The heating chamber is 12.6 in. long 4.6 in. wide and 3.6 in. high. The firebrick walls are reinforced with Buck stays, and the insulation is of the Sil-O-Cel type, with the Zander blast burner.

The furnace is inclined, and the material to be heated—yellow ochre—is packed into closed steel cylinders 4 in. in diameter and 4 ft. long, which are placed on the inclined hearth of the furnace and are heated to the required temperature. The cylinders are removed successively. The opening of the door acts as a mechanical device, which permits one cylinder to roll out of the front of the furnace and a fresh one to enter the furnace from an inclined rack at the rear. In the process of rolling through the furnace the ochre is burned black, the resultant product being a pigment for paint that can be applied to metals subjected to heat. This paint will not burn off, but will remain fixed within half an inch of a red-hot temperature.

The furnace, which will not be completed for some time, is being constructed by the National Power Construction Company.

Gas Machinery Co. Awarded Contract by Worcester Co.

The Gas Machinery Company, of Cleveland, Ohio, has been awarded the contract for a new 11-ft. double superheater carbureted water gas apparatus, condenser and auxiliary equipment to be erected in a new building at the works of the Worcester (Mass.) Gas Light Company. This new water gas set, in connection with apparatus that the Worcester company already has, will take care of the increased sales of gas and will insure continuance of efficient service to the consumers.

New Gas Installation for Birromite Chemical Company of America

Gas will be used for the heating of chemicals in the Birromite Chemical Company of America, at 54 East Fifty-fourth Street, Chicago. The gas will be used under two retort furnaces for heating the chemicals used in connection with the company's water-softener apparatus.

U. G. I. Contracting Company Reports New Contracts for Installations

The U. G. I. Contracting Company has been awarded a contract for the installation of an additional 8 ft. 6 in. set at the works of the Newport News and Hampton Railway, Gas & Electric Company of Newport News, Virginia. With the completion of this installation, the Newport News Company will have one of the most modern and efficient carburetted water gas plants in the East.

This company has just completed the work of equipping with hydraulic operation all of the sets of water gas apparatus, at the Ravenswood plant, of the Consolidated Gas Company of New York.

Also the Consolidated Gas Company of New Jersey has awarded the U. G. I. Contracting Company a contract for the installation of carburetted water gas set, having a capacity of 3,500,000 cu. ft. per day, to be installed at its works in Long Branch, N. J.

Albany Company Extending Lines to Rensselaer, N. Y.

Arrangements have been completed whereby the Municipal Gas Company, of Albany, N. Y., will supply the Albany Southern Railroad Company with gas for service to consumers of Rensselaer, N. Y. The necessary terms have been agreed upon between the two corporations whereby a 6-in. pipe will carry the Municipal Gas Company's supply to the Rensselaer mains. Steps have been taken to secure the necessary material for the construction of the pipe line by the Municipal Gas Company, and it is announced that the work will be pushed as rapidly as possible.

Price of Coke Advanced 20 Cents

The Grand Rapids Gas Light Company of Michigan will advance the price of gas coke 20 cents a ton Oct. 1, making the price $10.50 a ton, net.

Indications are that Pocahontas coal will advance 50 cents a ton Oct. 1, soft coal 25 cents a ton, Solvay coke 25 cents a ton.

Dealers say that if they are forced to buy from independent mines the price of hard coal may advance as much as $2 a ton.